REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR ATTAINMENT OF INDIANA'S PORTION OF THE CHICAGO-NAPERVILLE, ILLINOIS-INDIANA-WISCONSIN (IL-IN-WI), 2008 8-HOUR OZONE NONATTAINMENT AREA

Lake and Porter Counties, Indiana

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April 2016

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ACRONYMS/ABBREVIATION LIST

AMPD	Air Markets Performance Data
AQS	Air Quality System
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CAM_x	Comprehensive Air Quality Model with Extensions
CART	Classification and Regression Tree
CFR	Code of Federal Regulations
CMSA	Consolidated Metropolitan Statistical Area
CO	carbon monoxide
CTG	Control Technology Guidelines
CSAPR	Cross-State Air Pollution Rule
D.C.	District of Columbia
EGUs	electric generating units
EISA	Energy Independence and Security Act
EMITS	Emission Inventory Tracking System
FR	Federal Register
HC	hydrocarbons
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
IEPA	Illinois Environmental Protection Agency
IL	Illinois
IN	Indiana
km	kilometer
LADCO	Lake Michigan Air Director's Consortium
MACT	Maximum Achievable Control Technology
MATS	Mercury and Air Toxics Standards
MOU	Memorandum of Understanding
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MVEB	motor vehicle emissions budget
MWe	megawatt electrical
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NESHAP	National Emission Standards for Hazardous Air Pollutants
NIRPC	Northwestern Indiana Regional Planning Commission
NO_x	nitrogen oxides
NSPS	New Source Performance Standards
NSR	New Source Review
OAQ	Office of Air Quality
$PM_{2.5}$	particulate matter less than or equal to 2.5 $\mu g/m^3$ or fine particles
ppb	parts per billion
ppm	parts per million

PSD	Prevention of Significant Deterioration
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RFG	reformulated gasoline
RICE	reciprocating internal combustion engines
ROP	Rate of Progress
RRF	Relative Response Factor
SIP	State Implementation Plan
SO_2	sulfur dioxide
SUVs	sport utility vehicles
tpsd	tons per summer day
tpy	tons per year
U.S. EPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	volatile organic compound
WDNR	Wisconsin Department of Natural Resources
WI	Wisconsin
WRF	Weather Research Forecasting

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LAKE AND PORTER COUNTIES, INDIANA

1.0 INTRODUCTION

This document supports Indiana's request that the Indiana portion (Lake and Porter counties in Northwest Indiana) of the Chicago-Naperville, Illinois (IL)-Indiana (IN)-Wisconsin (WI), marginal nonattainment area be redesignated to attainment of the 2008 8-hour ozone standard. The states of Illinois and Wisconsin also intend to submit requests for their portions of the Chicago-Naperville, IL-IN-WI, marginal nonattainment area to be redesignated to attainment of the 2008 8-hour ozone standard. The entire Chicago-Naperville, IL-IN-WI, marginal nonattainment area has recorded three (3) years of complete, quality-assured ambient air quality monitoring data for the years 2013-2015 demonstrating attainment with the 2008 8-hour ozone standard.

Indiana's request is based on Section 107(d)(3)(D) of the Clean Air Act (CAA), which states:

> (D) The Governor of any State may, on the Governor's own motion, submit to the Administrator a revised designation of any area or portion thereof within the State. Within 18 months of receipt of a complete State redesignation submittal, the Administrator shall approve or deny such redesignation. The submission of a redesignation by a Governor shall not affect the effectiveness or enforceability of the applicable implementation plan for the State.

Section 107(d)(3)(E) of the CAA establishes specific requirements to be met in order for an area to be considered for redesignation, including:

(a) A determination that the area (or a portion thereof) has attained the national ambient air quality standard (NAAQS).
(b) A state implementation plan (SIP) for the area under Section 110(k) is fully approved.
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP or other federal requirements.
(d) A maintenance plan under Section 175A is fully approved.
(e) A determination that all Section 110 and Part D requirements have been met.

A maintenance plan provides for the continued attainment of the air quality standard by an area for a period of ten years after United States Environmental Protection Agency (U.S. EPA) has formally redesignated the area to attainment. The plan also provides assurances that even if there is a subsequent exceedance of the air quality standard, the measures in the maintenance plan will prevent any future occurrences through contingency measures that will be triggered.

This document addresses each of these requirements and provides additional information to support continued compliance with the 2008 8-hour ozone standard.

1.1 Background

Ground level ozone is not emitted directly into the air, but is created by chemical reactions with nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Ozone formation is promoted by strong sunlight, warm temperatures, and light winds; elevated levels predominantly occur during the hot summer months. In accordance with Table D-3 of Appendix D of 40 Code of Federal Regulations (CFR) Part 58, for the 2008 8-hour standard U.S. EPA mandates seasonal monitoring of ambient ozone concentrations in Indiana from April 1st through September 30th, in Illinois from April 1st through October 31st, and in Wisconsin from April 15th through October 15th. Beginning in 2017, the monitoring season ranges will change in Indiana and Illinois to March 1st through October 31st and in Wisconsin to March 1st through October 15th.

Due to the fact that ozone is formed in the ambient air, control of ozone focuses upon the reduction of precursor emissions (i.e. NO_x and VOC). NO_x is formed from the high-temperature reaction of nitrogen and oxygen during combustion processes in sources such as electric utility boilers, industrial fuel-burning sources, and motor vehicles. VOCs include many industrial solvents and coatings, as well as the hydrocarbons (HC) that are emitted by motor vehicles as evaporative losses from gasoline and tailpipe emissions of unburned hydrocarbon. Ground level ozone is associated with a number of adverse health and environmental impacts, including respiratory impairment and damage to crops and forests.

Ozone is one of the six criteria air pollutants that scientists have identified as being particularly harmful to humans and the environment. NAAQS have been developed for these six pollutants and are used as measurements of air quality. The CAA requires U.S. EPA to set primary standards at a level judged to be "requisite to protect the public health with an adequate margin of safety" and establish secondary standards that are requisite to protect public welfare from "any known or anticipated effects associated with the pollutant in the ambient air," including effects on crops, vegetation, wildlife, buildings and national monuments, and visibility.

1.2 National Ambient Air Quality Standards Designations

The CAA requires areas designated nonattainment for the NAAQS for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997, U.S. EPA revised the air quality standards for ozone thus, replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001.

U.S. EPA designated areas under the 1997 8-hour ozone standard on April 15, 2004, as attainment, nonattainment, or unclassifiable. If a nonattainment area is classified as "serious", "severe", or "extreme", the CAA mandates that the presumptive nonattainment boundary include the entire Consolidated Metropolitan Statistical Area (CMSA), or Metropolitan Statistical Area (MSA) and all of its Metropolitan Divisions. U.S. EPA designated Lake and Porter counties

nonattainment as a portion of the Chicago-Gary-Lake County, Illinois-Indiana, 1997 8-hour ozone nonattainment area and classified it "moderate" under Subpart 2 of Part D of the CAA. The Lake County-Kenosha County, Illinois-Wisconsin Metropolitan Division of the Chicago MSA was not included as part of the Chicago-Gary-Lake County, Illinois-Indiana nonattainment area. Therefore, U.S. EPA's designation of Lake and Porter counties, Indiana as part of this nonattainment area, and exclusion of other portions of the Chicago MSA like Kenosha County, Wisconsin, was discretionary rather than mandatory under the CAA.

The Chicago-Gary-Lake County, Illinois-Indiana area was subjected to nonattainment area rulemakings under the 1979 1-hour ozone standard, the 1997 8-hour ozone standard, and the 1997 annual standard for fine particles ($PM_{2.5}$). The 1-hour ozone standard was revoked on June 15, 2005. U.S. EPA approved Indiana's Redesignation Requests for attainment under the 1997 8-hour ozone standard on May 11, 2010, and under the 1997 annual $PM_{2.5}$ standard on February 6, 2012, respectively. This area remains classified as maintenance under both standards. Illinois' portion was also redesignated to attainment and classified as maintenance under the 1997 8-hour ozone standard on August 13, 2012, and the annual $PM_{2.5}$ standard on October 2, 2013, respectively.

On March 27, 2008, U.S. EPA significantly strengthened the 8-hour ozone standard to a level of 0.075 ppm, as shown in Table 1.1. An exceedance of the 2008 8-hour ozone NAAQS occurs when a monitor measures ozone above 0.075 ppm on average for an 8-hour period. A violation occurs when the average of the annual fourth highest daily maximum 8-hour ozone values over three consecutive years is greater than 0.075 ppm. This three-year average is termed the "design value" for the monitor. The design value for a nonattainment area is the highest monitor design value in the area.

Table 1.1: National Ambient Air Quality Standards for Ozone

	Primary Standards		**Secondary Standards**	
	Level	**Averaging Time**	**Level**	**Averaging Time**
1997 Ozone Standards	0.08 ppm*	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	
2008 Ozone Standards	0.075 ppm	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	
2015 Ozone Standard	0.070 ppm	Three-year average of the fourth highest 8-hour ozone value recorded each year.	Same as primary	

*Based on U.S. EPA's published data handling guidelines, values above 0.084 ppm were deemed to be in violation of the 1997 8-hour ozone standard.

Currently, the 2008 8-hour ozone nonattainment area within which Lake and Porter counties, Indiana are contained is called Chicago-Naperville IL-IN-WI (Chicago nonattainment area). On May 31, 2012, U.S. EPA designated this entire area as nonattainment in 40 CFR 81.315 and

classified it as "Marginal" under Subpart 2 of Part D, Title I of the CAA. This classification subjected the nonattainment area to the new 8-hour ozone requirements including the development of a plan to reduce NO_x and VOC emissions. This ruling required a demonstration that the area would meet the federal 2008 8-hour air quality standard for ozone by July 20, 2015.

On December 5, 2012, Indiana submitted a Request for Redesignation Petition and Maintenance Plan for attainment of the 2008 8-Hour Ozone NAAQS that would have designated Lake and Porter counties separately from the rest of the Chicago nonattainment area. This also included an ozone maintenance plan and motor vehicle emission budgets (MVEBs) for VOCs and NO_x. These requests were denied by U.S. EPA effective January 9, 2015.[1]

1.3 Geographical Description

The specific counties and partial counties that comprise the Chicago-Naperville, IL-IN-WI, nonattainment area as defined in 40 CFR 81.314, 40 CFR 81.315, and 40 CFR 81.350, include: Cook, DuPage, Grundy (partial), Kane, Kendall (partial), Lake, McHenry, and Will counties, Illinois; Kenosha County (partial), Wisconsin; and Lake and Porter counties, Indiana.

Lake and Porter counties are located in Northwest Indiana and contain such cities as Gary, Hammond, East Chicago, Portage, and Valparaiso. Lake and Porter counties are bordered by Lake Michigan to the north, the Indiana counties of Newton and Jasper to the south, and LaPorte to the east. The Illinois counties of Cook, Kankakee, and Will border Lake and Porter counties to the west. In Illinois and Wisconsin, the nonattainment area contains such cities as Chicago, Elgin, Aurora, and Joliet in Illinois, and the City of Kenosha and Village of Pleasant Prairie in Wisconsin.

These areas are depicted in Figure 3.1. The Indiana Department of Environmental Management (IDEM), the Illinois Environmental Protection Agency (IEPA), and the Wisconsin Department of Natural Resources (WDNR) are responsible for assuring the nonattainment area for the 2008 8-hour ozone standard complies with the CAA requirements.

1.4 Status of Air Quality

On August 27, 2015, U.S. EPA announced that it is proposing to determine that the Chicago nonattainment area failed to attain the 2008 8-hour ozone standard using 2012-2014 design values by the attainment date of July 20, 2015.[2] Accordingly, as required by Section 181(b)(2)(A) of the CAA, when U.S. EPA finalizes its determination that the area failed to attain the standard, the entire nonattainment area will be reclassified to "Moderate" for the 2008 8-hour NAAQS.

The Chicago nonattainment area has recorded three (3) years of ambient air quality monitoring data for the most recent years of 2013–2015 that demonstrates attainment of the 2008 8-hour ozone standard. This fact, accompanied by the permanent and enforceable decreases in emission levels discussed in Section 4.0, justifies a redesignation to attainment for Indiana's portion of the

[1] http://www.gpo.gov/fdsys/pkg/FR-2014-12-10/pdf/2014-28799.pdf
[2] http://www.gpo.gov/fdsys/pkg/FR-2015-08-27/pdf/2015-21196.pdf

Chicago-Naperville, IL-IN-WI, nonattainment area based on Section 107(d)(3)(E) of the CAA. As such, Indiana is requesting that Lake and Porter counties be redesignated to attainment and awarded a completeness determination prior to any actions, including the development of new reasonably available control measures (RACM) that may be required after being reclassified to "Moderate".

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAA lists a number of requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled *Procedures for Processing Requests to Redesignate Areas to Attainment*, issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance and supplemented with additional guidance received from staff of the Attainment Planning and Maintenance Section of U.S. EPA Region V. The specific requirements for redesignation are listed below.

2.2 Ozone Monitoring

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.15, has been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

2) Ambient monitoring data, quality assured in accordance with 40 CFR 58.15, have been recorded in the U.S. EPA Air Quality System (AQS) database and made available for public view.

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, are below 75 parts per billion (ppb). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the state will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

2.3 Emission Inventory

1) A comprehensive emissions inventory of the precursors of ozone completed for the base-year (one of the three years used for the designation of nonattainment).

2) A projection of the emissions inventory to a year at least ten years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that the improvement in air quality between the years that violations occurred and attainment was achieved is based on permanent and enforceable emission reductions, not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future annual updates of the inventory to enable tracking of the emission levels, including an annual emission statement from major sources.

2.4 Modeling Demonstration

While there is not any modeling required to redesignate ozone nonattainment areas, IDEM has incorporated photochemical modeling information in Section 7 as part of this document to further support its request for Lake and Porter counties to be redesignated to attainment.

2.5 Controls and Regulations

1) A U.S. EPA-approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for New Source Review (NSR).

4) Assurances that existing controls will remain in effect after redesignation, unless the state demonstrates through photochemical modeling that the standard can be maintained without one or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with and are consistent with the SIP.

2.6 Corrective Actions for Potential Future Violations of the Standard

1) A commitment to submit a revised plan eight (8) years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standards occur.

3) A list of potential contingency measures that could be implemented in such an event.

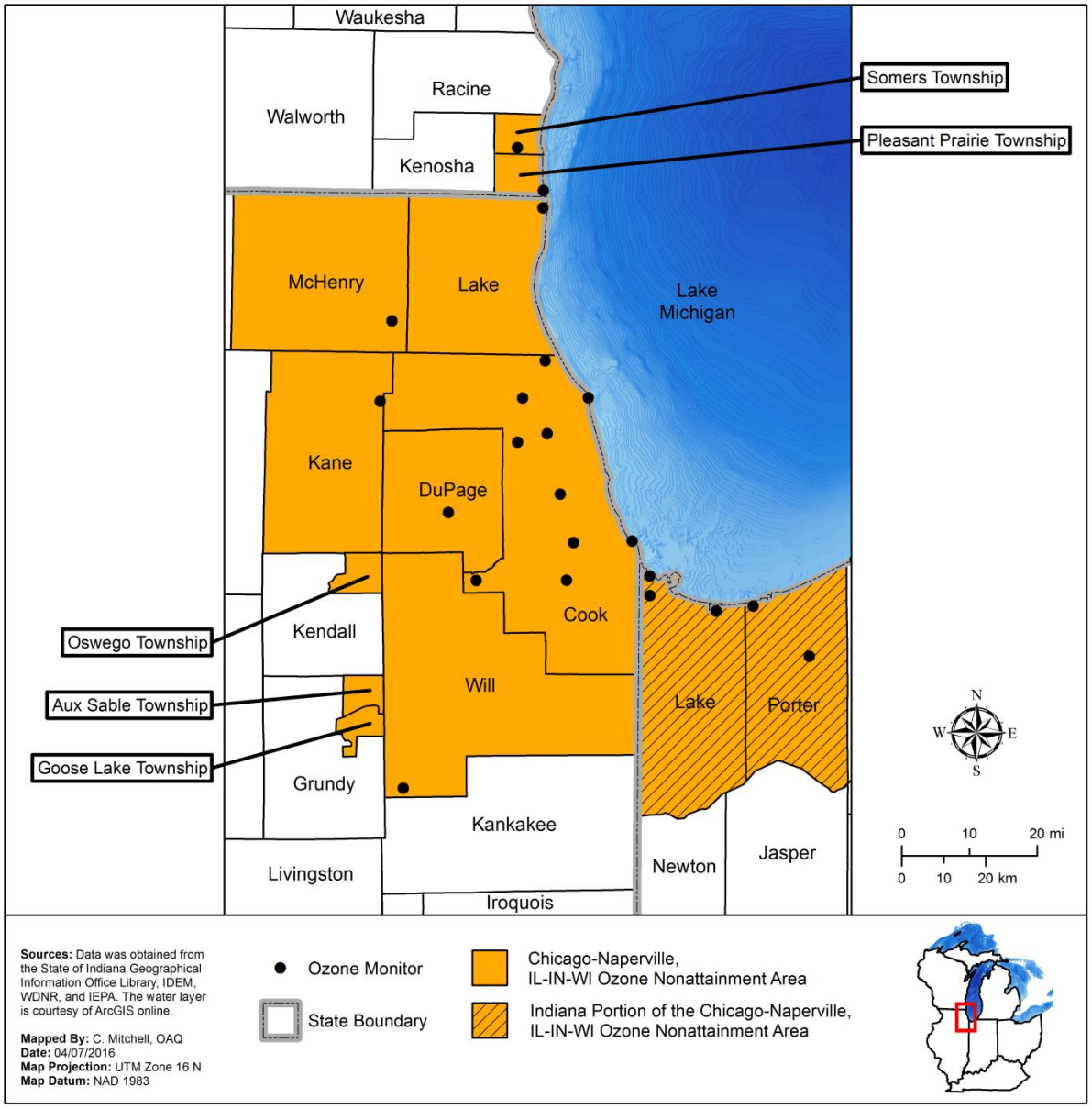
4) A list of NO_x and VOC sources potentially subject to future controls.

3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There are currently twenty-two (22) Federal Reference Method monitors measuring ozone concentrations in the Chicago-Naperville, IL-IN-WI, nonattainment area. Five monitors are located in Indiana's portion of the nonattainment area and are operated by IDEM's Office of Air Quality (OAQ). There are currently fifteen monitors located in Illinois' portion of the nonattainment area that are operated by the IEPA and two monitors located in Wisconsin's portion of the nonattainment area that are operated by the WDNR. The monitor readings from 2010–2015 are shown in Tables 3.1 and 3.2 as well as Appendix A. Graph 3.1 depicts the 2013–2015 design values for the monitors within Lake and Porter counties, Indiana, while Graph 3.3 displays the values from Illinois' and Wisconsin's monitors. Indiana's, Illinois's, and Wisconsin's monitor values were retrieved from U.S. EPA's AQS database. The locations of the monitoring sites for this nonattainment area are shown in Figure 3.1.

Figure 3.1: Chicago-Naperville, IL-IN-WI, Nonattainment Area



3.2 Ambient Ozone Monitoring Data

As explained in 40 CFR Part 50, Appendix P, three (3) complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.075 ppm. When this occurs the site is deemed to be in attainment. A maximum of three (3) significant digits are carried in the computations and digits to the right of the third decimal place are truncated (i.e. any computation greater than 0.075 ppm is truncated to 0.075 ppm. Values equal to or below 0.075 ppm meet the standard; values equal

to or greater than 0.076 ppm exceed the standard. These data handling procedures are applied on an individual basis at each monitor in the area. An individual site's three-year average of the annual fourth highest daily maximum 8-hour average ozone concentration is called the site's design value. The air quality design value for the area is the highest design value among all sites in the area.

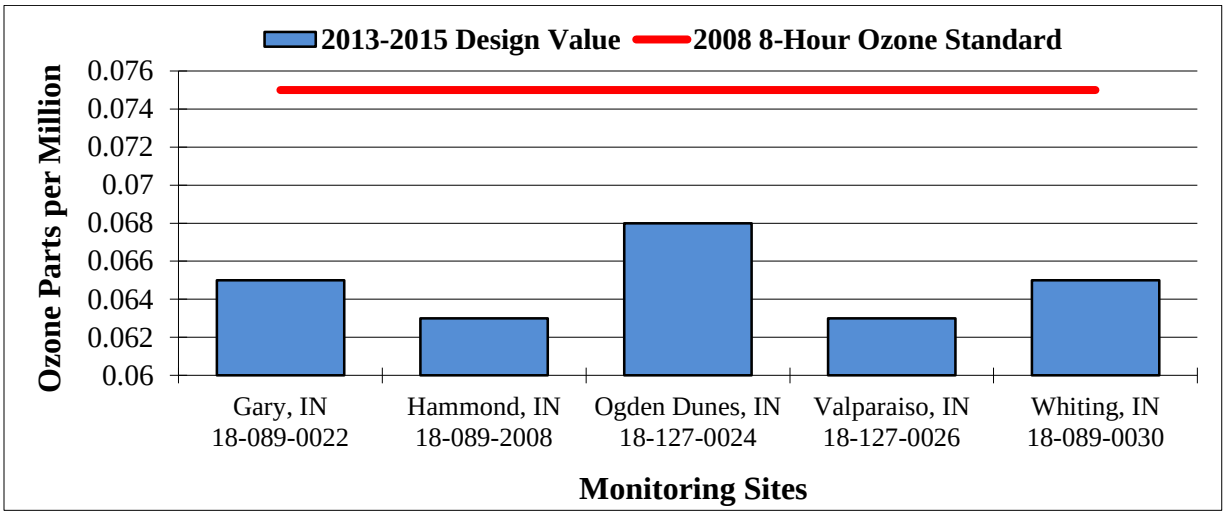
Table 3.1 outlines the annual fourth high values and three-year design values for 2010-2015 for the five active monitoring sites in Indiana. During this period, the design values for Indiana's portion of the nonattainment area demonstrate that the 2008 8-hour NAAQS for ozone has been attained. For the most recent design value (2013-2015), all monitors measured less than or equal to 0.068 ppm. All of the fourth- highest values that make up the 2013-2015 design value's in Lake and Porter counties, Indiana, are also below the 2008 8-hour ozone NAAQS of 0.075 ppm. Graph 3.1 demonstrates that the 2013-2015 design values for Indiana's portion of the nonattainment area are well below the 2008 8-hour ozone NAAQS.

Table 3.1: Monitoring Sites' 2010-2015 Annual 4th Highs and Design Values - Lake and Porter Counties, Indiana

	Annual 4th High (ppm)						Design Values (average of 4th highs) (ppm)			
AQS # Site County	2010	2011	2012	2013	2014	2015	2010-2012	2011-2013	2012-2014	2013-2015
18-089-0022 Gary Lake	0.064	0.066	0.078	0.064	0.067	0.064	0.069	0.069	0.069	0.065
18-089-2008 Hammond Lake	0.069	0.072	0.077	0.063	0.067	0.060	0.072*	0.070*	0.069*	0.063
18-127-0024 Ogden Dunes Porter	0.067	0.068	0.081	0.069	0.071	0.066	0.072	0.072	0.073	0.068
18-127-0026 Valparaiso Porter	0.061	0.063	0.067	0.063	0.067	0.060	0.063	0.064	0.065	0.063
18-089-0030 Whiting Lake	0.069	0.069	0.081	0.062	0.065	0.070	0.073	0.070	0.069	0.065

*Design value is flagged in AQS as "not valid".

Graph 3.1: Monitoring Sites' 2013-2015 Design Values - Lake and Porter Counties, Indiana



Graph 3.2 shows the trend in design values in Lake and Porter counties, Indiana, from 2000-2015. A comprehensive list of the fourth-highest daily maximum 8-hour average ozone concentrations over this period is included in Appendix A. The area's design values trend downward as emissions have declined due to such programs as the Acid Rain program and cleaner automobiles and fuels both regionally and locally. U.S. EPA's rule to control nitrogen oxides from specific source categories (40 CFR Parts 51, 72, 75, and 96, published on October 17, 1998 and referred to as the "NO_x SIP Call") has significantly reduced emissions from large electric generating units (EGUs), industrial boilers, and cement kilns. Indiana's NO_x SIP Call Rule was approved on June 6, 2001 (326 Indiana Administrative Code (IAC) 10-3 and 10-4). EGUs are now regulated by the federal Cross-State Air Pollution Rule (CSAPR). The SIP submittals for NO_x reductions of other Midwest states were also approved in this timeframe.

Graph 3.2: Highest Monitor Design Values from 2000-2015 Compared to the 1997 and 2008 8-hour Ozone Standards - Lake and Porter Counties, Indiana

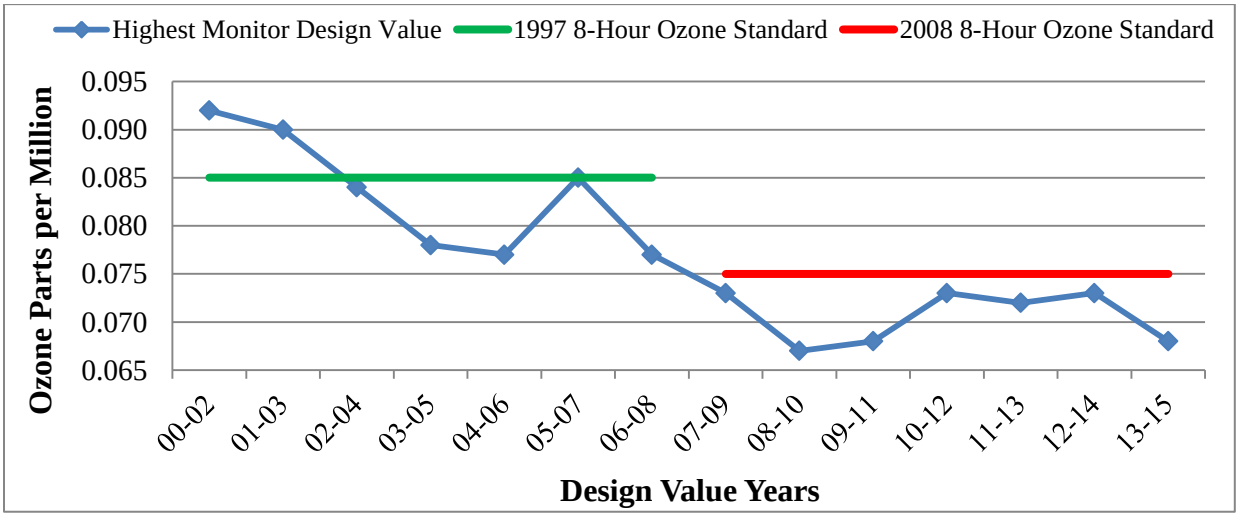


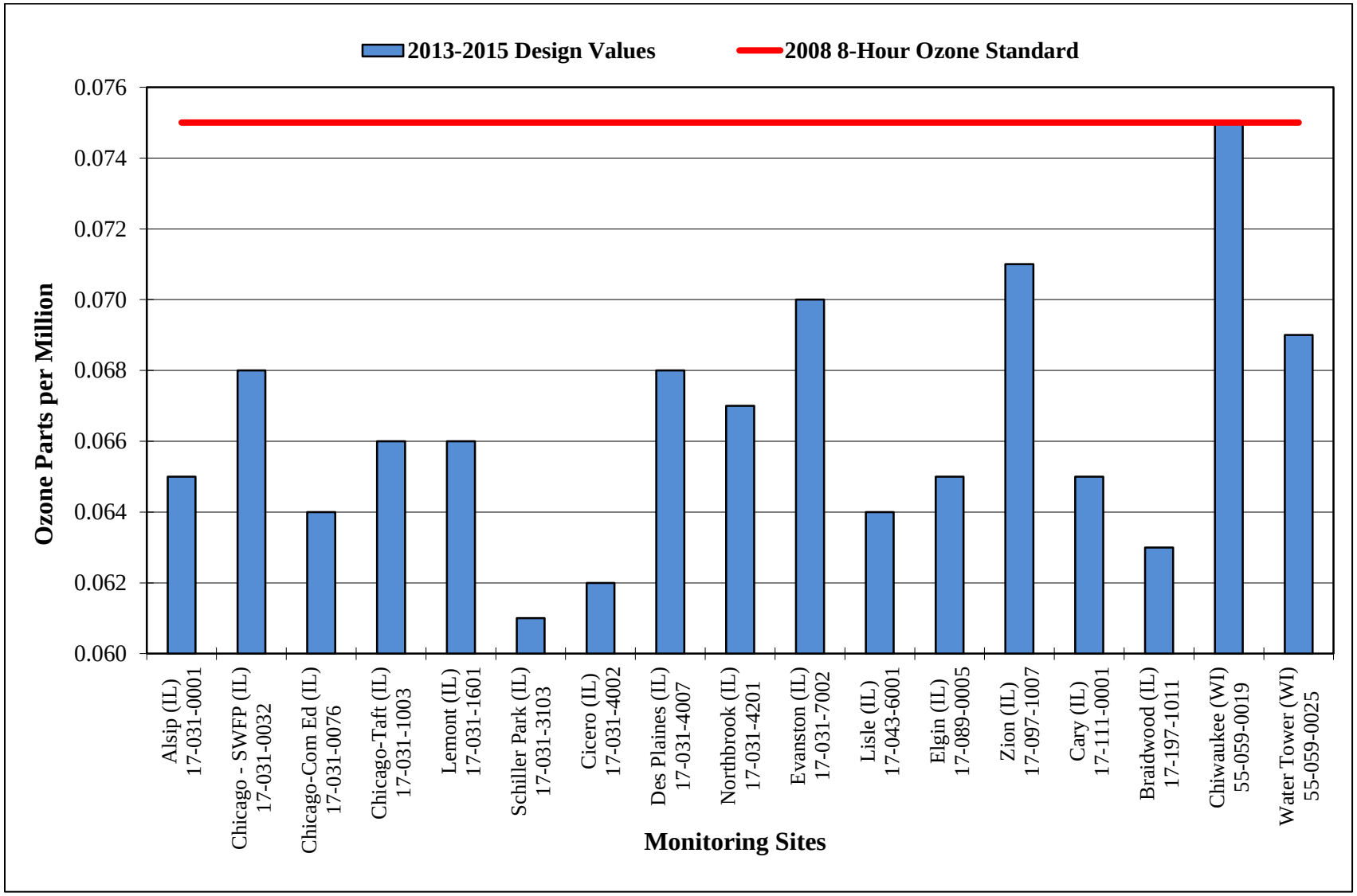
Table 3.2 outlines the annual fourth-high values and three-year design values for 2010 through 2015 for sixteen (16) Illinois monitoring sites (15 active and 1 inactive as of 10/31/2013) and two (2) Wisconsin active monitoring sites within their respective portions of the nonattainment area. All of these sites recorded design values at or below the 2008 8-hour ozone NAAQS of 0.075 ppm for the most recent design value years of 2013-2015 as shown in Graph 3.3. Graph 3.4 illustrates the downward trend that Illinois' and Wisconsin's monitors in the Chicago nonattainment area have demonstrated leading up to the current design value years that have brought their portions into attainment of the 2008 8-hour ozone NAAQS.

Table 3.2: Monitoring Site's Annual 4th Highs and Design Values for Illinois and Wisconsin, 2010-2015

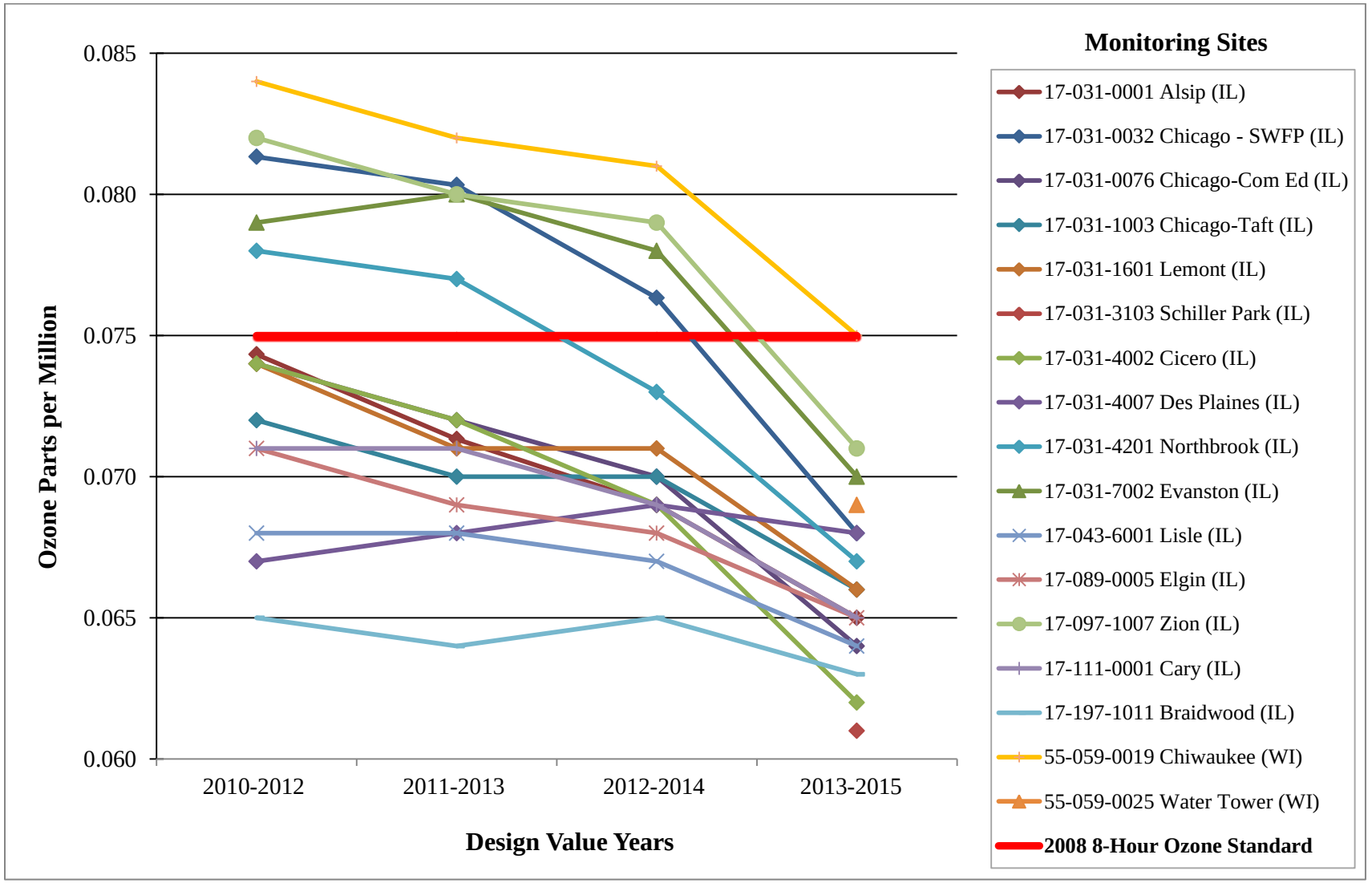
Monitors			Annual 4th High (ppm)						Design Values (average of 4th highs) (ppm)			
AQS #	County	Site	2010	2011	2012	2013	2014	2015	2010-2012	2011-2013	2012-2014	2013-2015
17-031-0001	Cook	Alsip	0.073	0.071	0.079	0.064	0.066	0.066	0.074	0.071	0.069	0.065
17-031-0032	Cook	Chicago-SWFP	0.074	0.079	0.091	0.071	0.067	0.066	0.081	0.080	0.076	0.068
17-031-0064 (ended 10/31/2013)	Cook	Chicago-Ellis Ave	0.071	0.074	0.081	0.058			0.075	0.071		
17-031-0076	Cook	Chicago-ComEd	0.068	0.073	0.081	0.062	0.067	0.065	0.074	0.072	0.070	0.064
17-031-1003	Cook	Chicago-Taft	0.070	0.067	0.079*	0.066	0.065	0.068	0.072	0.070	0.070*	0.066
17-031-1601	Cook	Lemont	0.073	0.069	0.081	0.064	0.070	0.066	0.074	0.071	0.071	0.066
17-031-3103 (started 04/01/2013)	Cook	Schiller Park				0.062	0.063	0.058		0.062*	0.062*	0.061
17-031-4002	Cook	Cicero	0.068	0.072	0.083	0.063	0.063	0.061	0.074	0.072	0.069	0.062
17-031-4007	Cook	Des Plaines	0.064	0.065	0.073	0.067	0.069	0.068	0.067	0.068	0.069	0.068
17-031-4201	Cook	Northbrook	0.072	0.076	0.087	0.069	0.065	0.068	0.078	0.077	0.073	0.067
17-031-7002	Cook	Evanston	0.067	0.078	0.093	0.069	0.072	0.070	0.079	0.080	0.078	0.070
17-043-6001	DuPage	Lisle	0.064	0.068	0.074	0.063	0.064	0.067	0.068	0.068	0.067	0.064
17-089-0005	Kane	Elgin	0.069	0.070	0.075	0.064	0.066	0.065	0.071	0.069	0.068	0.065
17-097-1007	Lake	Zion	0.078	0.076	0.093	0.072	0.073	0.070	0.082	0.080	0.079	0.071
17-111-0001	McHenry	Cary	0.065	0.071	0.077	0.065	0.067	0.064	0.071	0.071	0.069	0.065
17-197-1011	Will	Braidwood	0.065	0.061	0.071	0.061	0.064	0.064	0.065	0.064	0.065	0.063
55-059-0019	Kenosha	Chiwaukee	0.081	0.081	0.092	0.075	0.076	0.075	0.084	0.082	0.081	0.075
55-059-0025	Kenosha	Water Tower				0.069	0.070	0.068				0.069

*Design value is flagged in AQS as "not valid".

Graph 3.3: Monitoring Sites' 2013-2015 Design Values - Illinois and Wisconsin



Graph 3.4: Monitoring Sites' 2010-2015 Design Value Trends - Illinois and Wisconsin



3.3 Current Status of Data

The 2013-2015 design values for all of the ozone-monitoring sites within the Chicago nonattainment area are in attainment for the 2008 8-hour ozone standard. On October 16, 2015, Indiana sent U.S. EPA a letter requesting early certification of Lake and Porter's 2015 ozone season monitoring data. This data was used for the 2015 ozone season in the calculations that determined the final design values for 2013-2015.

3.4 Quality Assurance

Indiana, Illinois, and Wisconsin have all quality-assured their portions of the data shown in Appendix A in accordance with 40 CFR 58.15. Indiana, Illinois, and Wisconsin have each recorded their data in the AQS database making the data available to the public.

3.5 Continued Monitoring

Indiana, Illinois, and Wisconsin commit to continue monitoring ozone levels at the sites indicated in Table 3.1, Table 3.2, and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making changes to the existing monitoring network, should changes become necessary in the future. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Updates to the IDEM website will provide real time availability of the data and knowledge of any exceedances.[3] IDEM will enter all data into AQS in a timely manner in accordance with federal guidelines.

4.0 EMISSIONS INVENTORY

U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (NO_x and VOC) representative of the year when the area achieves attainment of the ozone air quality standard. Other related requirements include a projection of the emission inventory to a year at least ten (10) years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the 2008 8-hour ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the ten (10) year maintenance period. This portion of the submittal is required by Sections 172(c)(3) and 182(a)(1) of the CAA.

In consultation with U.S. EPA, Illinois, Wisconsin, and other stakeholders, a base-year of 2011, attainment-year of 2014, an interim-year of 2020, and a maintenance-year of 2030 was selected. Indiana must demonstrate that the improvement in air quality between the 2011 base-year and the 2014 attainment-year is based on permanent and enforceable emission reductions. The inventories that IDEM has prepared include data by source category: EGU sources, non-EGU point sources, non-point sources (area), non-road sources, and on-road sources for precursors of ozone. The following subsections address each of the aforementioned requirements and include

[3] http://www.in.gov/idem/4670.htm

comprehensive evaluations of NO_x and VOC emissions in Lake and Porter counties, Indiana, and the entire Chicago nonattainment area as a whole for the above agreed upon years as well as a reference-year of 2008.

4.1 Inventory Years

Indiana received inventory data from Illinois and Wisconsin for the years of 2011, 2014, 2020, and 2030 to be used in the entire nonattainment area calculations. These emission inventories, in addition to Lake and Porter's, compose the graphs and tables within the following sections in 4.0 of this document and contain the words "Entire Nonattainment Area" as part of the title. (Appendix D [Historic] and E [Projected])

The 2008 National Emissions Inventory (NEI) data was pulled directly from U.S. EPA's Emissions Modeling Clearinghouse.[4] It was not modified with any other data and is presented as historical reference for the entire nonattainment area. It should also be noted that the on-road values specific to 2008 only were developed using the Motor Vehicle Emission Simulator (MOVES) 2010 model.

The 2011 base-year emissions inventory represents a comprehensive, accurate, and current inventory of actual emissions from all sources of NO_x and VOCs in Lake and Porter counties. The Ozone NAAQS Emissions Modeling platform (2011v6.2) was used to collect data for the 2011 NEI year. Point source (EGU and non-EGU), non-point, and non-road emissions were compiled from the data available on U.S. EPA's Emissions Modeling Clearinghouse website for the entire Chicago nonattainment area.[5] A further description of the development of the 2011 base-year inventory can be found in Appendix F. On-road values for Lake and Porter counties were back casted from emission factors produced by U.S. EPA's 2014 version of the MOVES software program. Biogenic emissions are not included in these summaries.

U.S. EPA is in the process of preparing the 2014 NEI dataset and therefore could not be used for this demonstration. Lake and Porter's 2014 total point source inventory includes the categories of EGU and non-EGU emissions. These sources submit their emissions data through Indiana's Emission Statement program. IDEM's OAQ annually collates this data into the Emission Inventory Tracking System (EMITS) for storage and calculations. The estimates contained herein are based on the reported annual emissions from the sources in the counties affected. To maintain a comparable estimate, U.S. EPA-tracked airport activities were interpolated between the 2011 NEI and the 2017 EPA-projected inventory and then added to the non-EGU point source category. Airport activities fall outside of the required reporting under Indiana Administrative Code 326 IAC 2-6. The 2014 non-point and non-road inventories were also developed by interpolating between U.S. EPA's 2011 NEI and U.S. EPA's 2017-projected inventory datasets. The 2014 on-road inventory was calculated from emission factors produced by U.S. EPA's 2014 version of the MOVES software program.

[4] http://www3.epa.gov/ttn/chief/net/2008inventory.html

[5] https://www.epa.gov/air-emissions-modeling/2011-version-62-technical-support-document

Lake and Porter's projected inventory for 2020 was interpolated between the U.S. EPA-projected inventories for 2017 and 2025. The projected inventory for 2030 was estimated using inventory data points from 2011, 2014, 2017, and 2025 and utilizing the TREND function in Microsoft Excel. If the TREND function resulted in a negative value the emissions were assumed to not change.

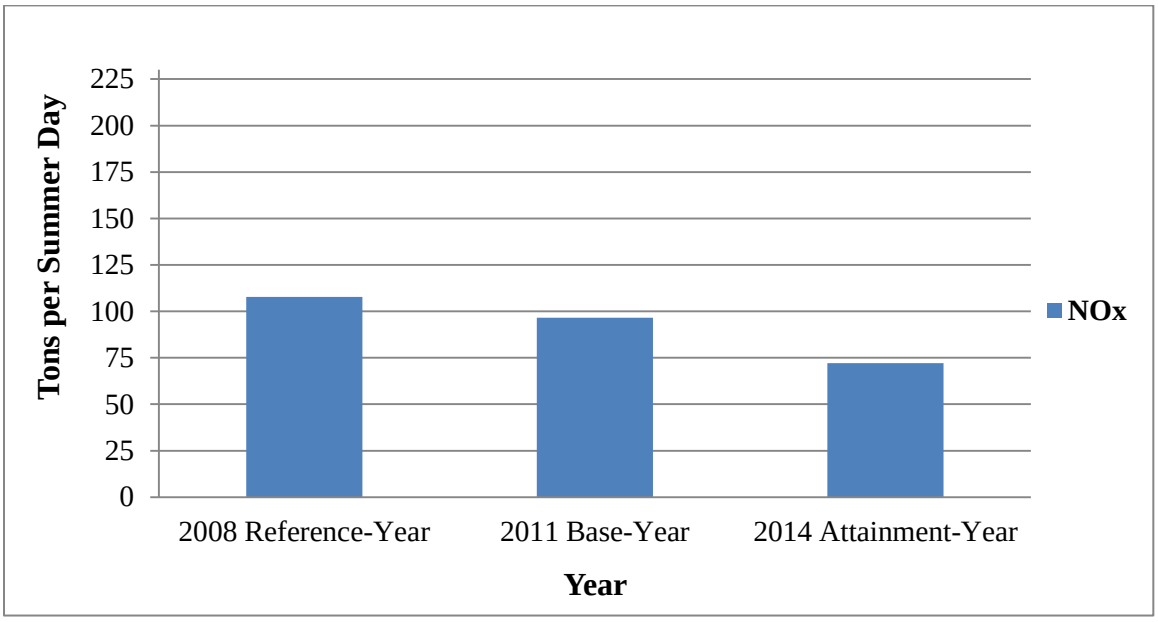
4.2 Emission Trends

The NO_x and VOC emissions inventories for 2008, 2011, and 2014 were compared between year as well as anthropogenic emission source category. These roughly follow the years of monitored air quality trends discussed in Section 3.0.

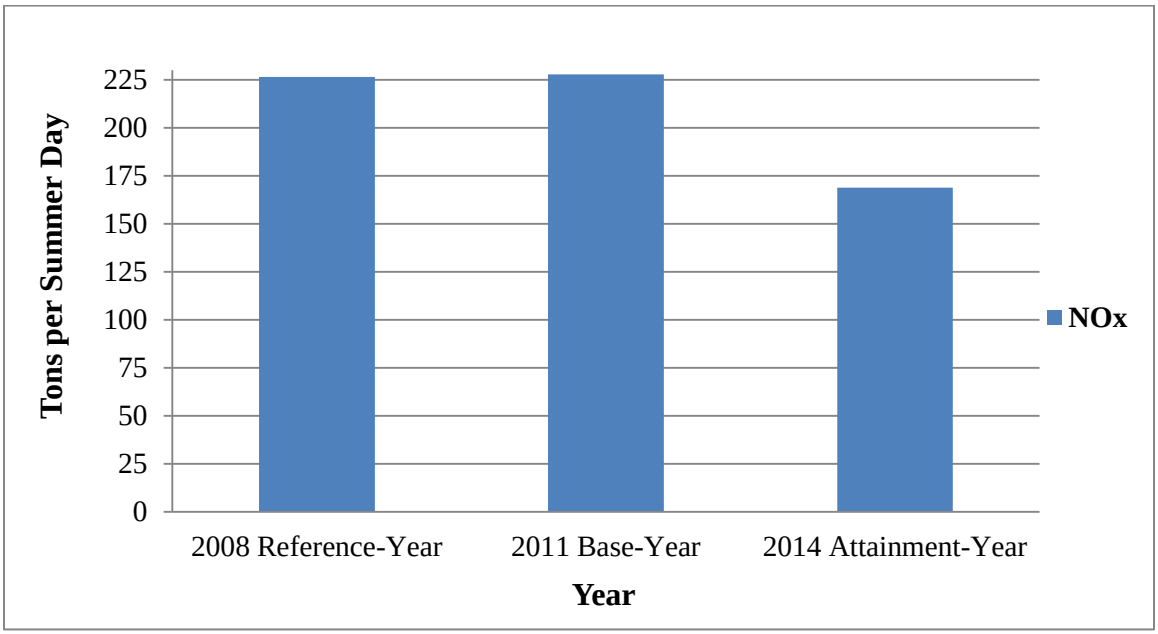
4.2.1 Point Sources

Graphs 4.1 through 4.4 show the trend in NO_x and VOC point source emissions in tons per summer day (tpsd) for 2008, 2011, and 2014. They include Lake and Porter counties, Indiana and the entire nonattainment area as a whole. Graphs and data tables of emissions for point sources are available in Appendix B.

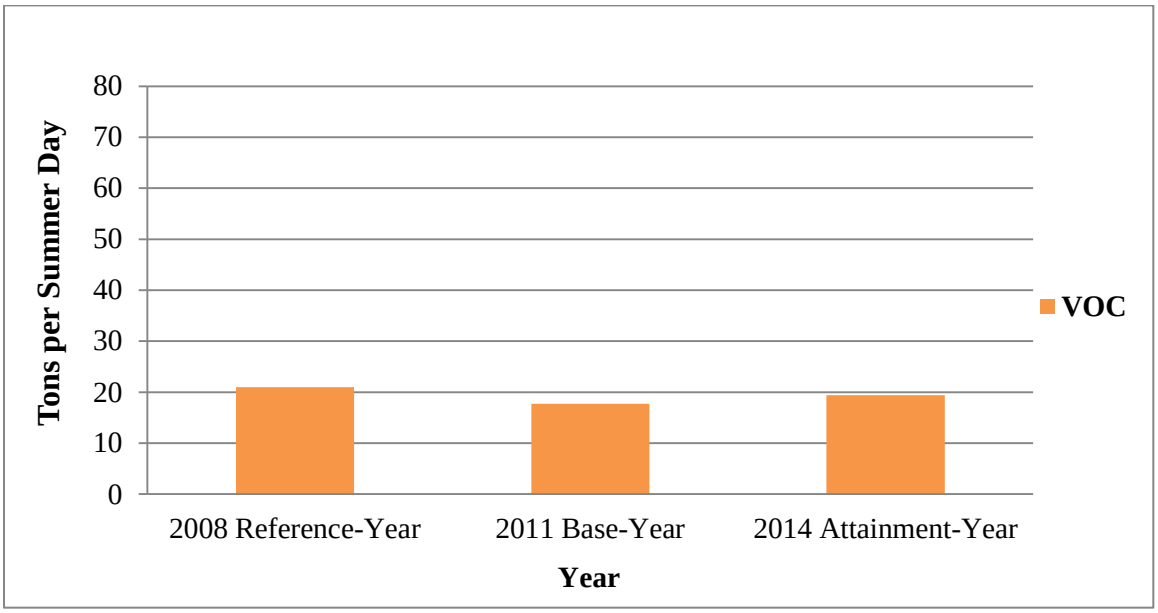
Graph 4.1: NO_x Point Source Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) - Lake and Porter Counties, Indiana



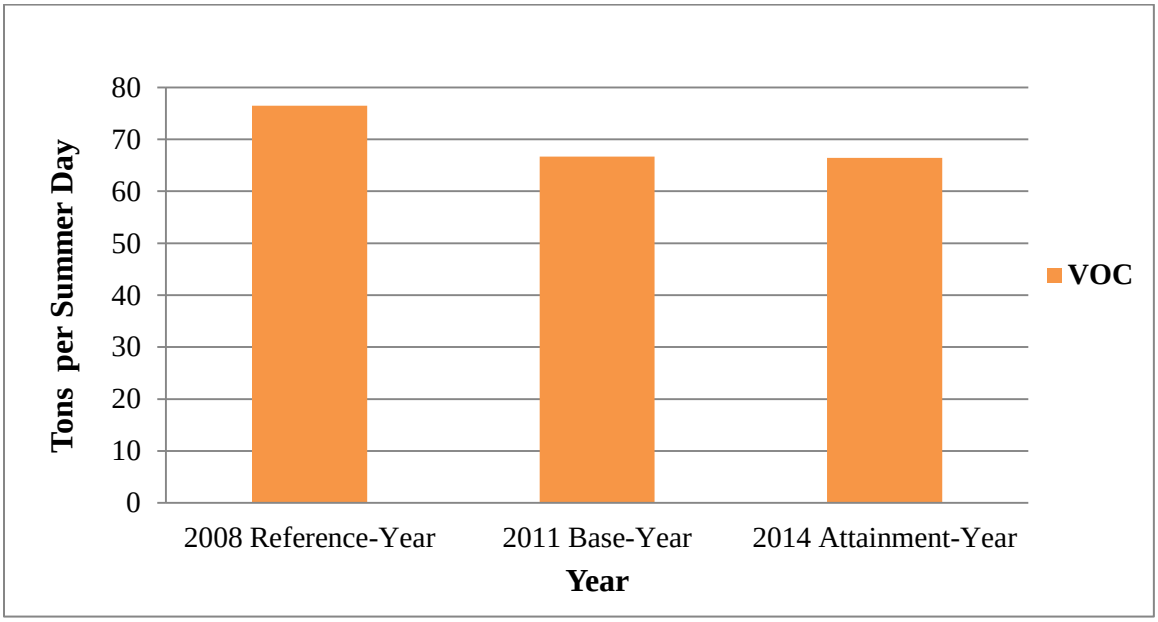
Graph 4.2: NO_x Point Source Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) – Entire Chicago Nonattainment Area



Graph 4.3: VOC Point Source Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) - Lake and Porter Counties, Indiana



Graph 4.4: VOC Point Source Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) – Entire Chicago Nonattainment Area



4.2.2 Electric Generating Unit (EGU) Sources

Graph 4.5 shows the trend in regional NO_x emissions (tons per ozone season) from EGUs in Lake and Porter counties. Graph 4.6 depicts the trends of NO_x emissions (tons per ozone season) from EGUs for the entire Chicago nonattainment area. While ozone and its precursors are also

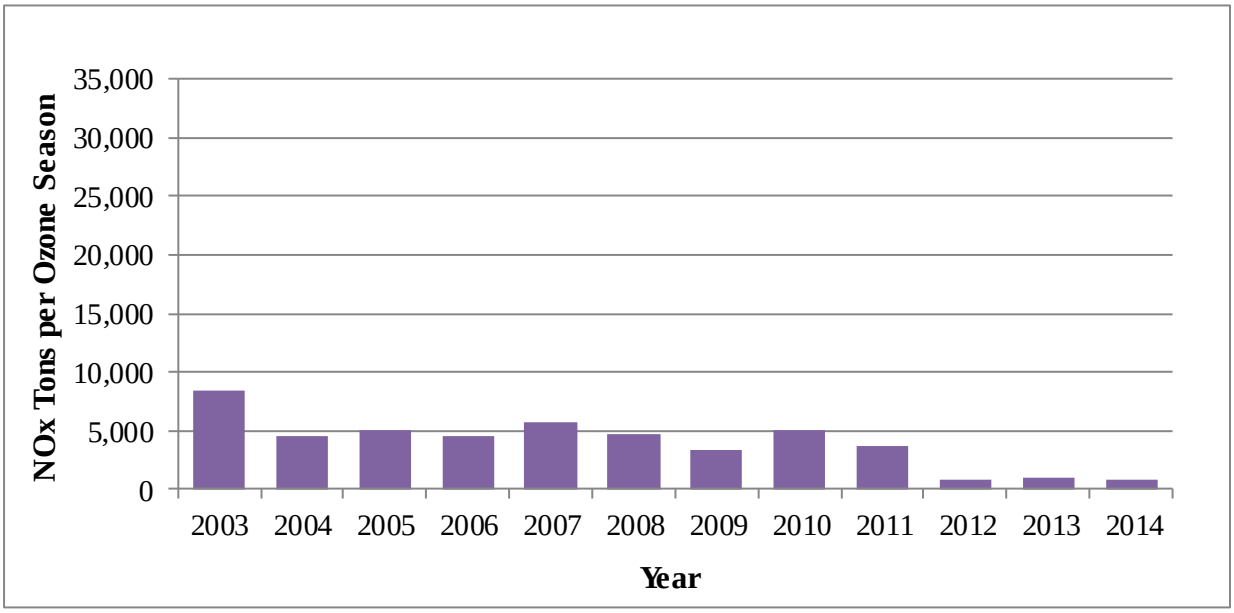
transported into this region from outside areas, this information does provide indication that emissions are decreasing substantially. This is in part a result of national programs affecting all EGUs such as the Acid Rain program, the Clean Air Interstate Rule (CAIR), and now CSAPR. Other sectors of the inventory also impact ozone formation, but large regional sources, such as EGUs, have a substantial impact on the formation of ozone. Graphs and data tables of emissions for EGU sources are available in Appendix C.

These data were taken from U.S. EPA's Clean Air Markets Program Data (AMPD).[6] Data are available sooner for these units than other point sources in the inventory because of the NO_x budgets and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the NO_x SIP Call budget period began May 31, 2004.

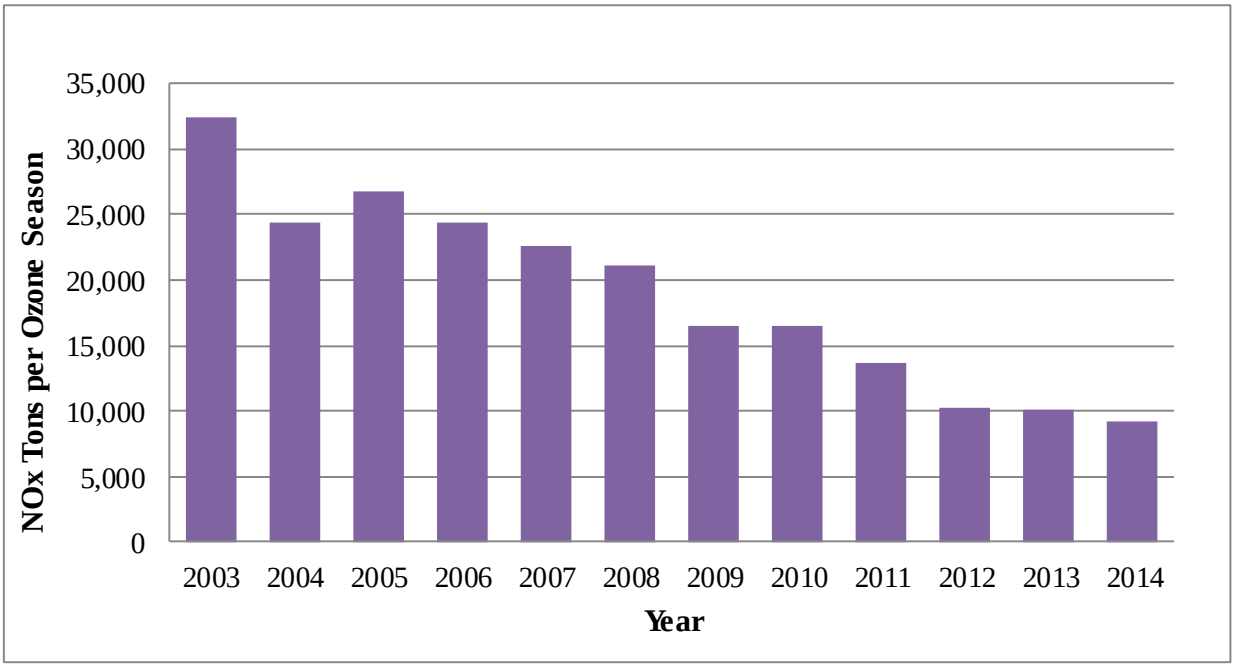
As part of the NO_x SIP Call, states were required to adopt into their rules a budget for all large EGUs. Indiana's budget, which represents a statewide cap on NO_x emissions, is now found in the federal transport rule for NO_x ozone season trading rules at 40 CFR 97, Subpart BBBBB. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. To summarize, NO_x emissions have dramatically decreased over the years as represented on these graphs. These emissions, capped by the state rule, should remain at least this low through the maintenance period covered by this request.

[6] http://www.epa.gov/airmarkets/

Graph 4.5: NO_x Emissions, Electric Generating Units – Lake and Porter Counties, Indiana, 2003-2014



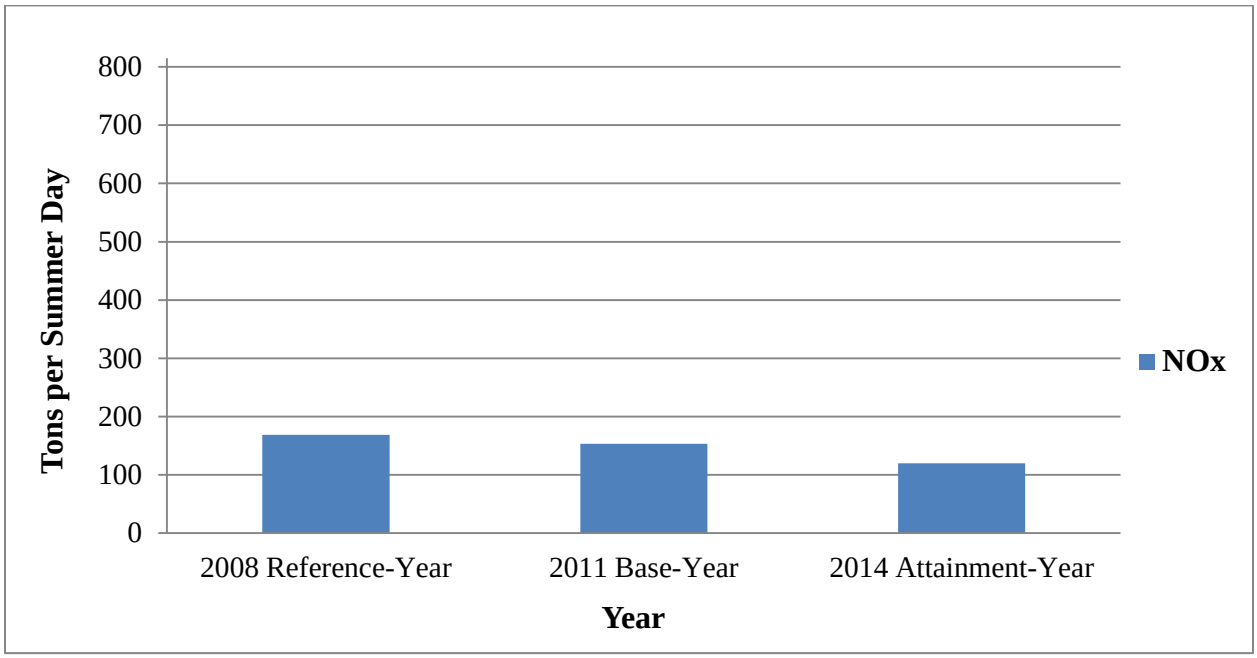
Graph 4.6: NO_x Emissions, Electric Generating Units – Entire Chicago Nonattainment Area, 2003-2014



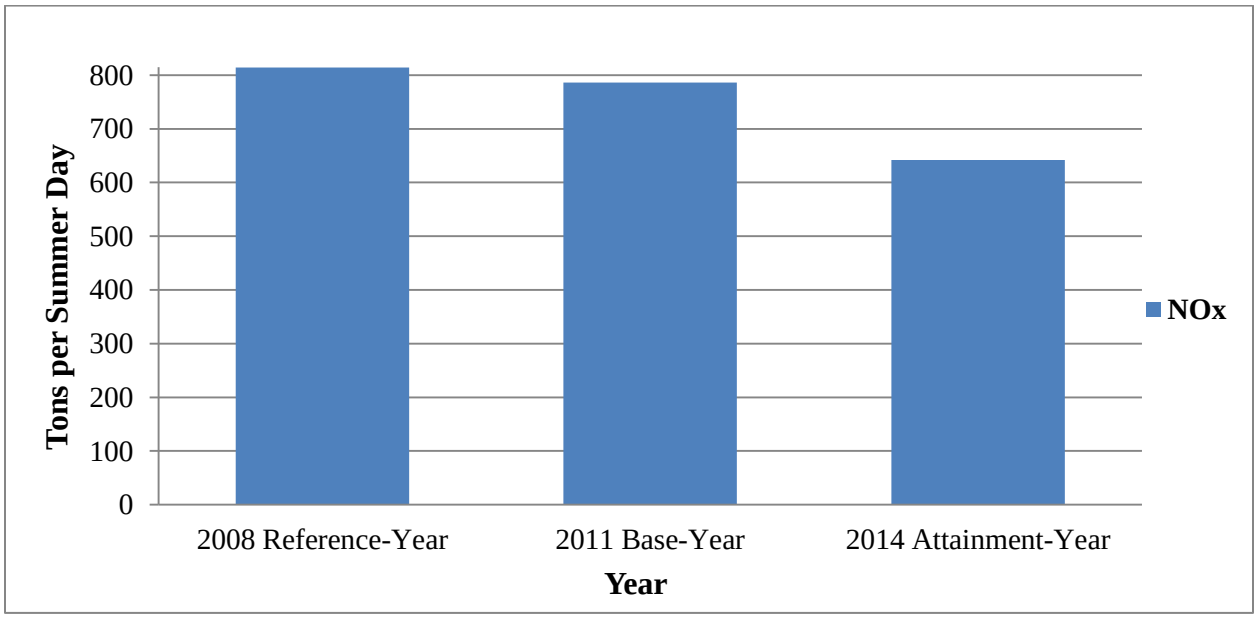
4.2.3 All Anthropogenic Sources

Periodic inventories were prepared for the 2008 reference-year, the 2011 base-year, and the 2014 attainment-year that include emissions (tpsd) from all anthropogenic source categories. Graphs 4.7 through 4.10 illustrate anthropogenic NO_x emissions for both Lake and Porter counties, Indiana, and the entire Chicago nonattainment area. Graphs 4.7 and 4.8 show the total emission values by year. Graphs 4.9 and 4.10 show the emission values by each source category. Graphs 4.11 through 4.14 illustrate anthropogenic VOC emissions for both Lake and Porter counties, Indiana, and the entire Chicago nonattainment area. Graphs 4.11 and 4.12 show the total emission values by year. Graphs 4.13 and 4.14 show the emission values by each source category. Historical graphs and data tables of these emissions are available in Appendix D.

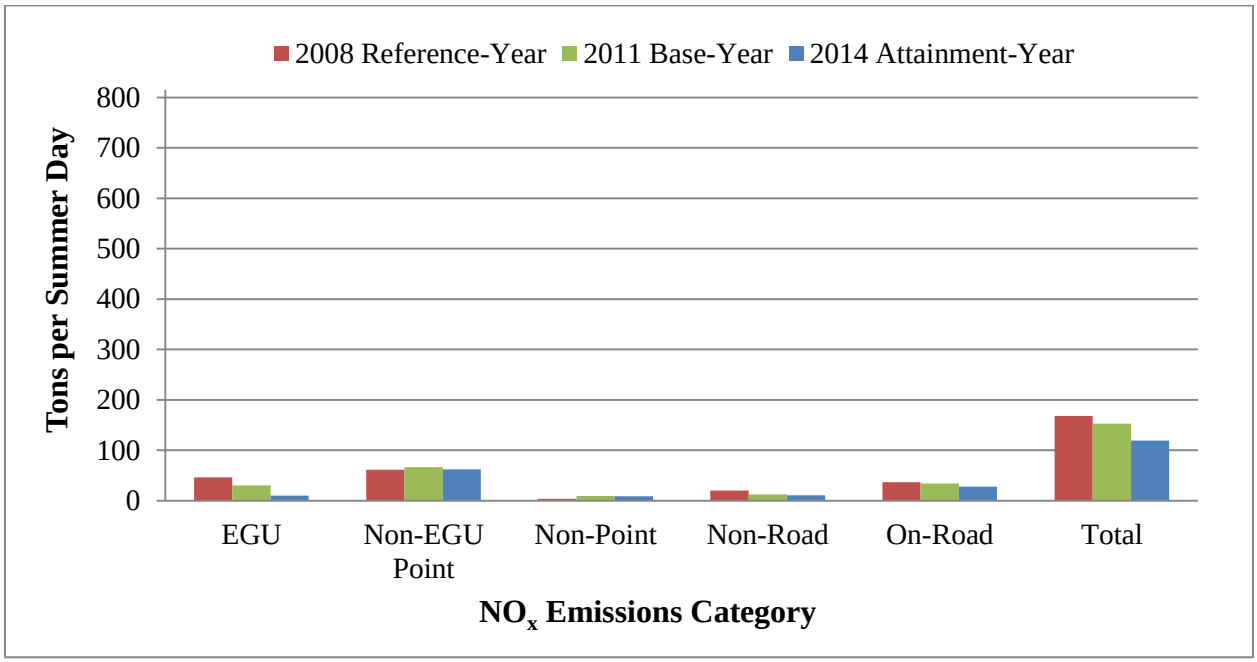
Graph 4.7: NO_x Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year), All Anthropogenic Sources – Lake and Porter Counties, Indiana



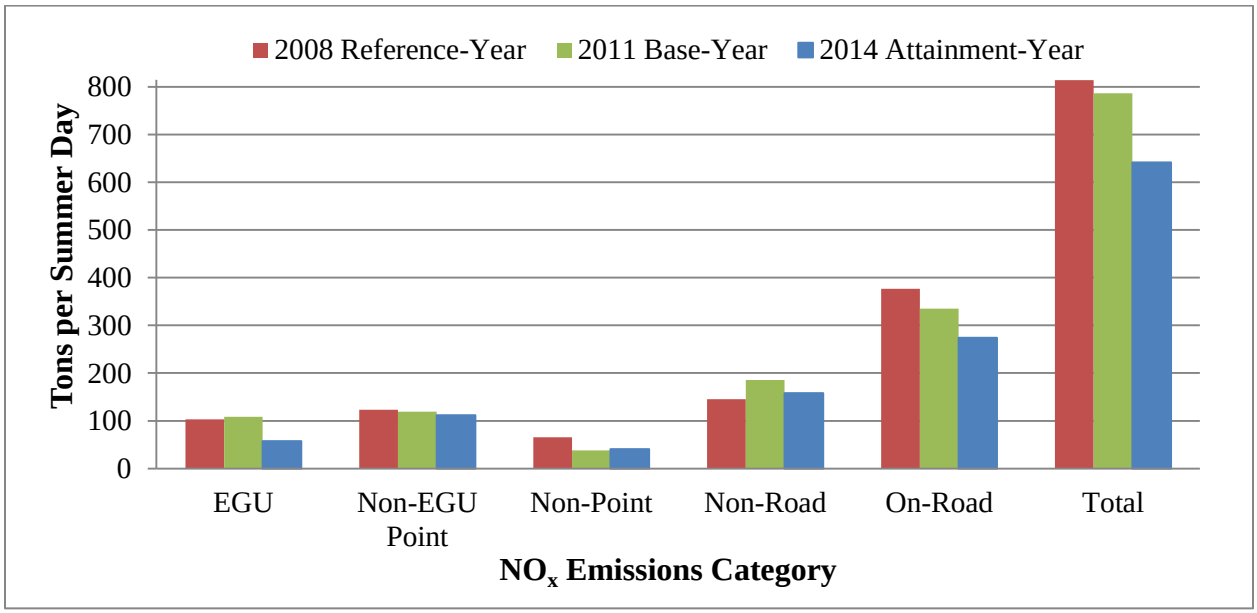
Graph 4.8: NO_x Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year), All Anthropogenic Sources – Entire Chicago Nonattainment Area



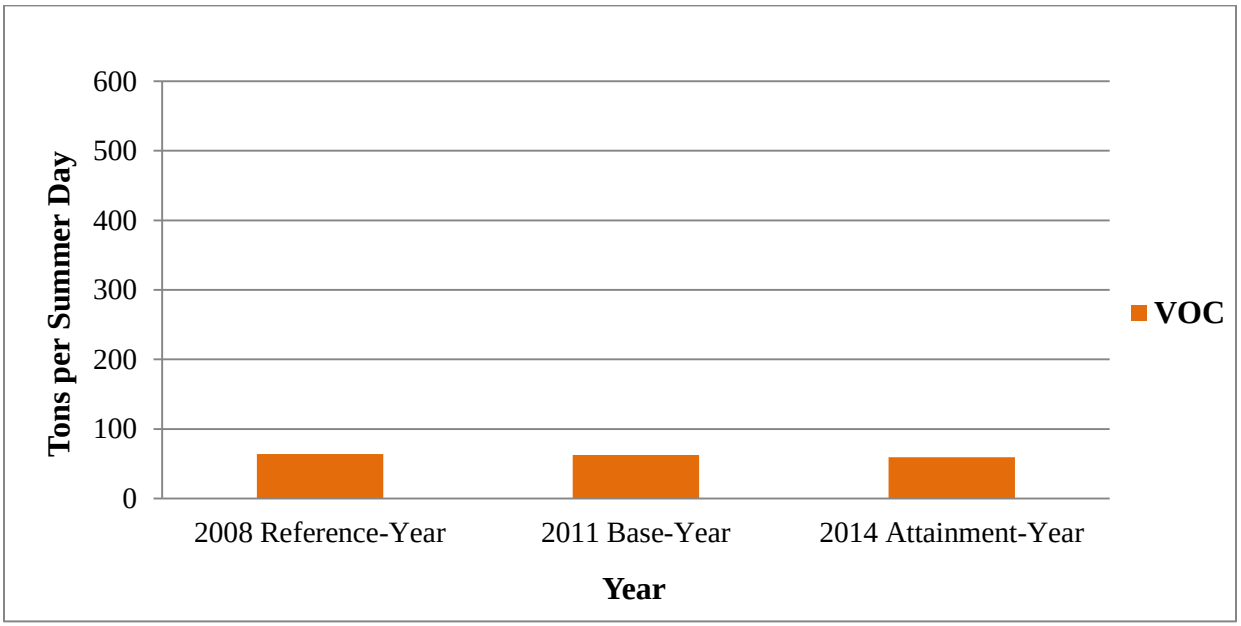
Graph 4.9: NO_x Emissions by Source Category for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) – Lake and Porter Counties, Indiana



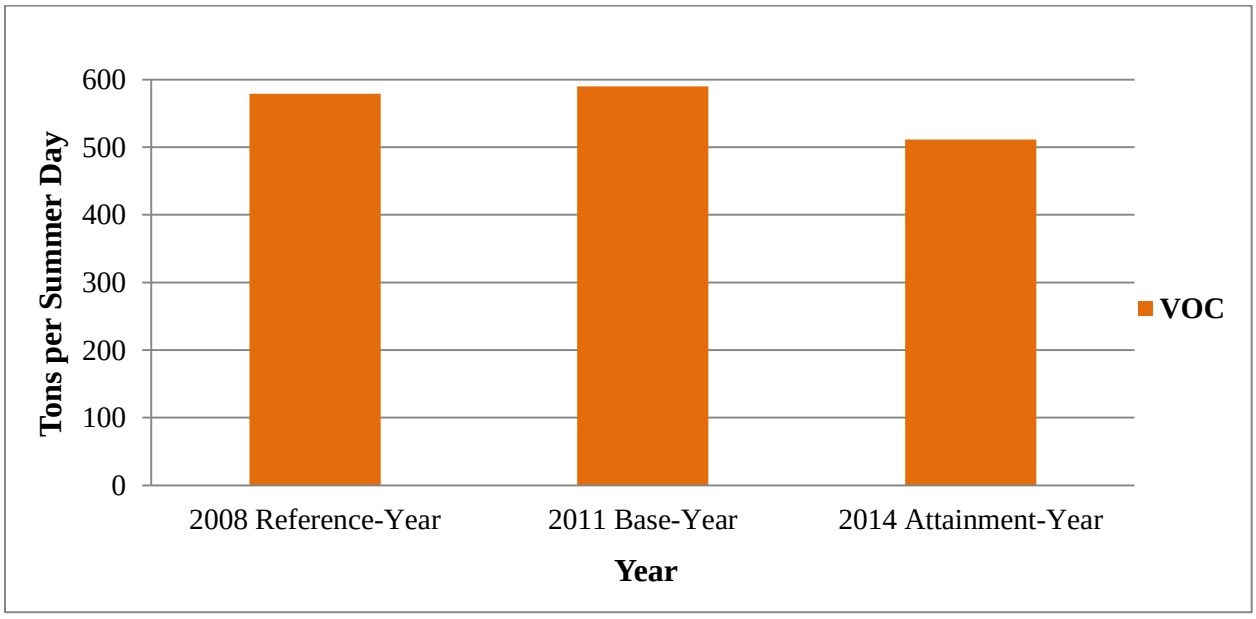
Graph 4.10: NO_x Emissions by Source Category for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) – Entire Chicago Nonattainment Area



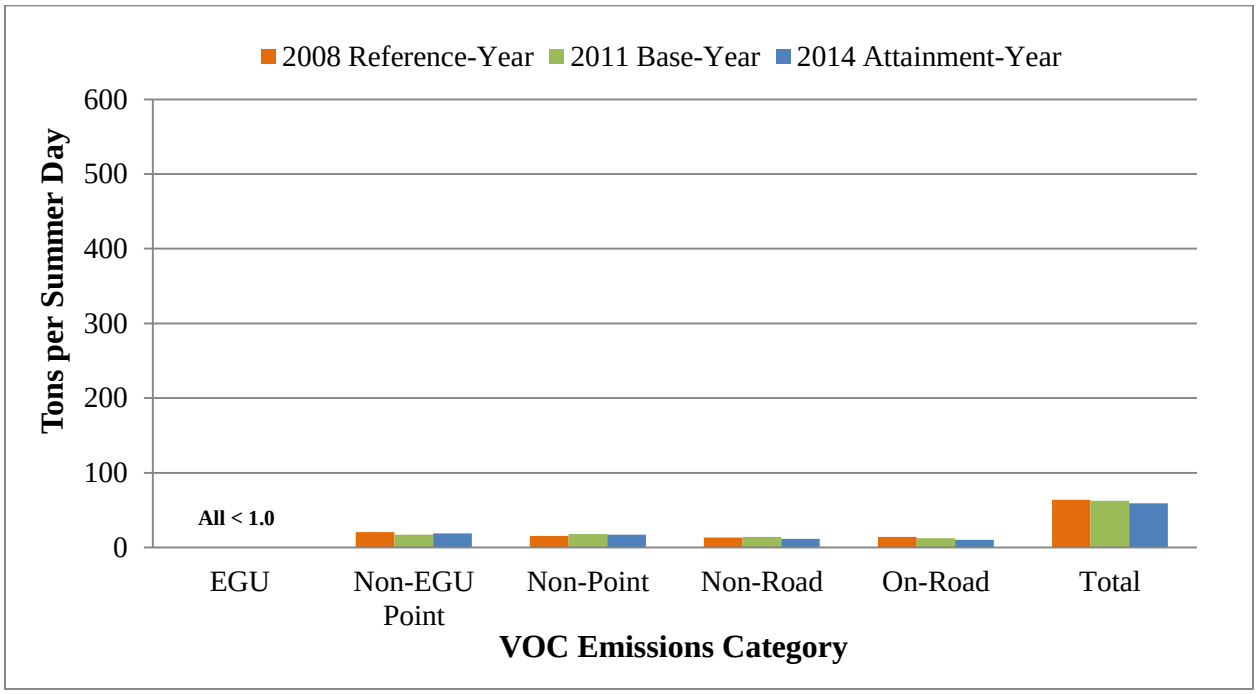
Graph 4.11: VOC Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year), All Anthropogenic Sources – Lake and Porter Counties, Indiana



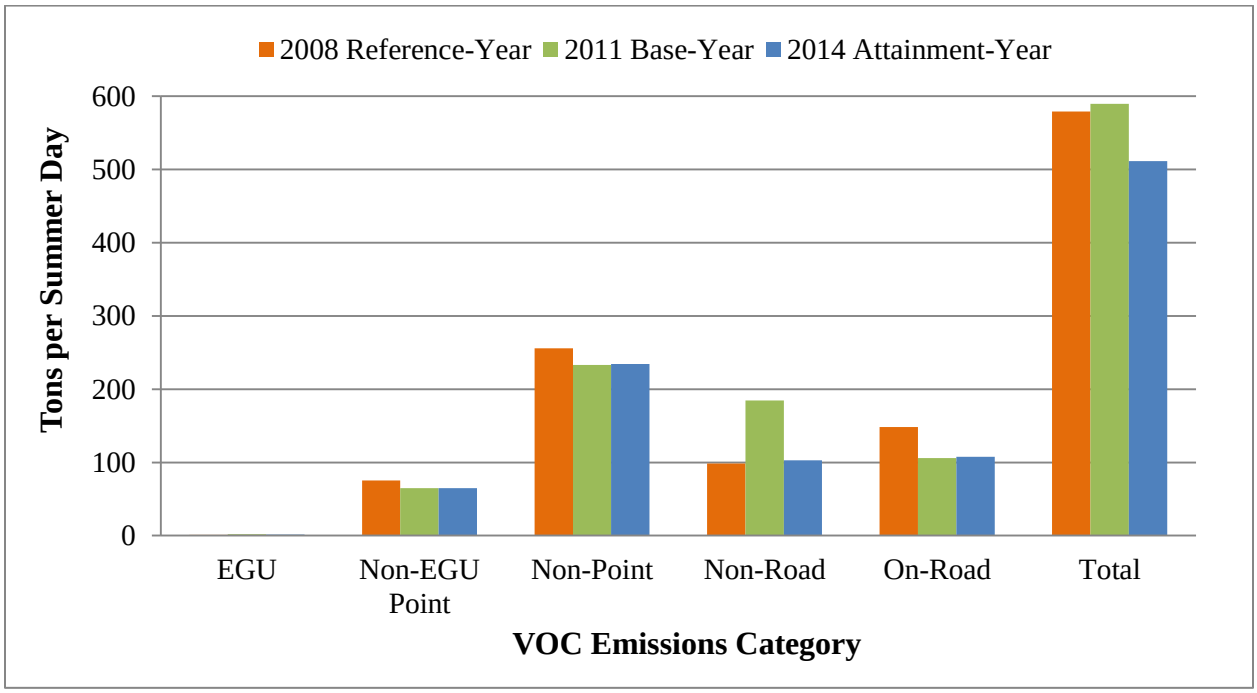
Graph 4.12: VOC Emissions for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year), All Anthropogenic Sources – Entire Chicago Nonattainment Area



Graph 4.13: VOC Emissions by Source Category for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) - Lake and Porter Counties, Indiana



Graph 4.14: VOC Emissions by Source Category for 2008 (Reference-Year), 2011 (Base-Year), and 2014 (Attainment-Year) – Entire Chicago Nonattainment Area

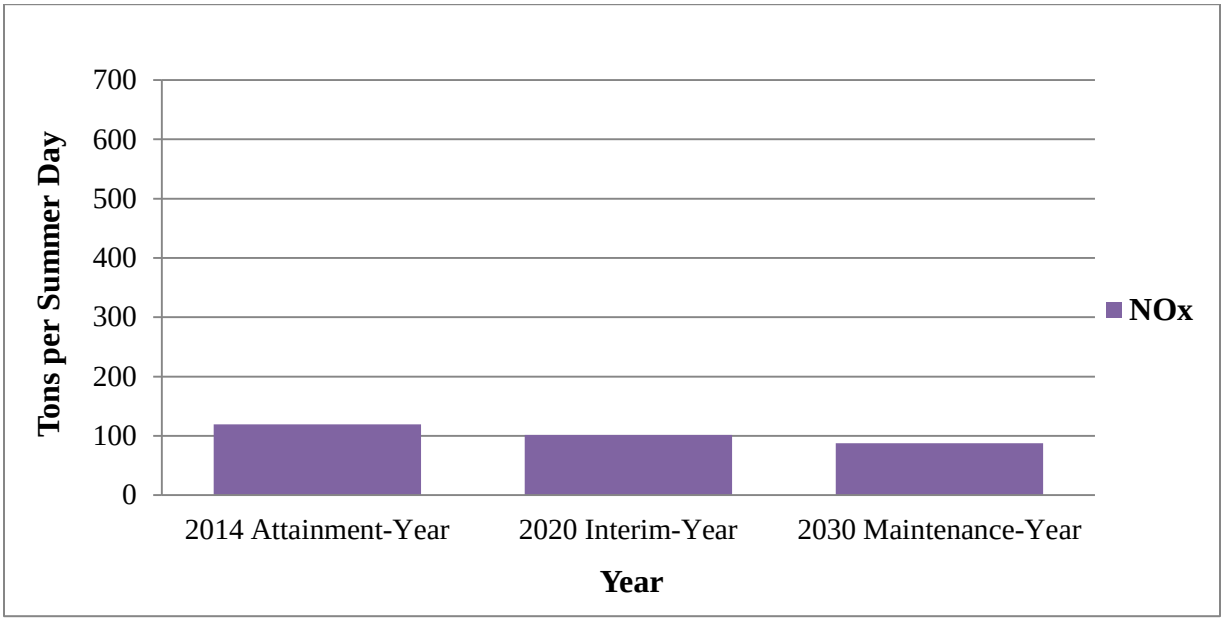


4.3 Emission Projections

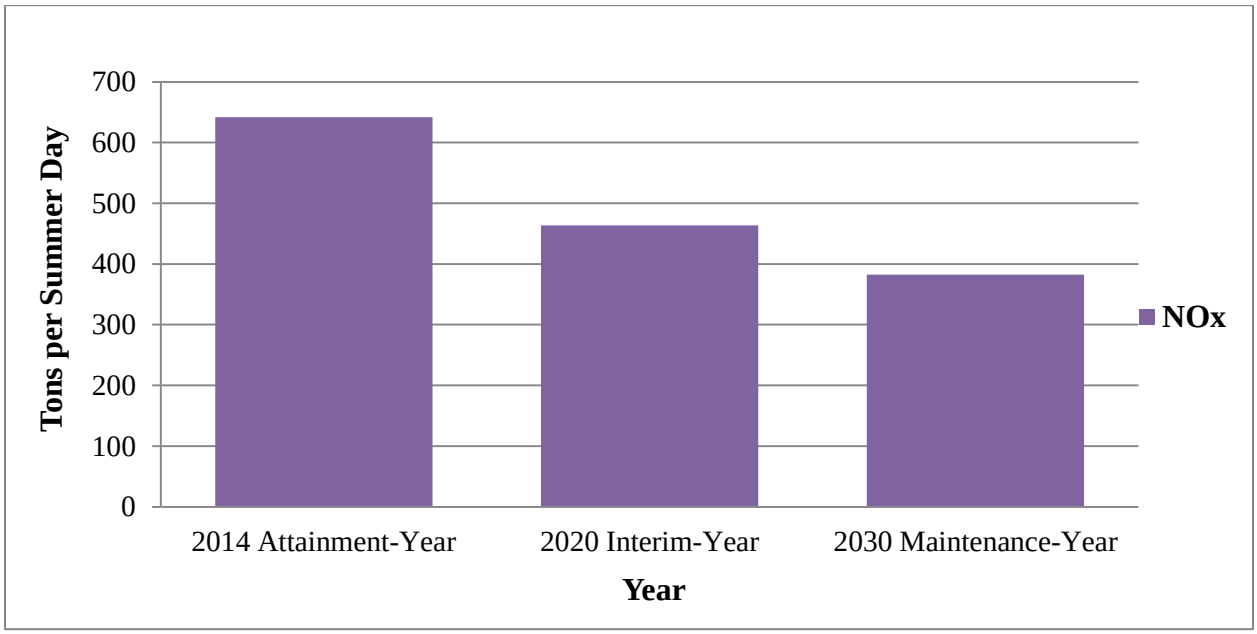
NO_x and VOC emission trends are an important gauge for continued compliance with the 2008 8-hour ozone standard. Therefore, IDEM performed a comparison of NO_x and VOC emissions inventories (tpsd) for the 2014 attainment-year, the 2020 interim-year, and the 2030 maintenance-year as well as between categories of anthropogenic emission sources. The detailed NO_x and VOC inventories for Lake and Porter counties and the entire nonattainment area for the years of 2014, 2020, and 2030 can be found in Appendix E.

Graphs 4.15 through 4.18 compare anthropogenic NO_x emissions for both Lake and Porter counties and the entire nonattainment area. Graphs 4.15 and 4.16 compare the total emission values by year. Graphs 4.17 and 4.18 show the emission values from each source category. Graphs 4.19 through 4.22 compare anthropogenic VOC emission from both Lake and Porter counties and the entire nonattainment area. Graphs 4.19 and 4.20 show the total emission values by year. Graphs 4.21 and 4.22 show the emission values from each source category. Mobile source emission inventories are described further in Section 5.0.

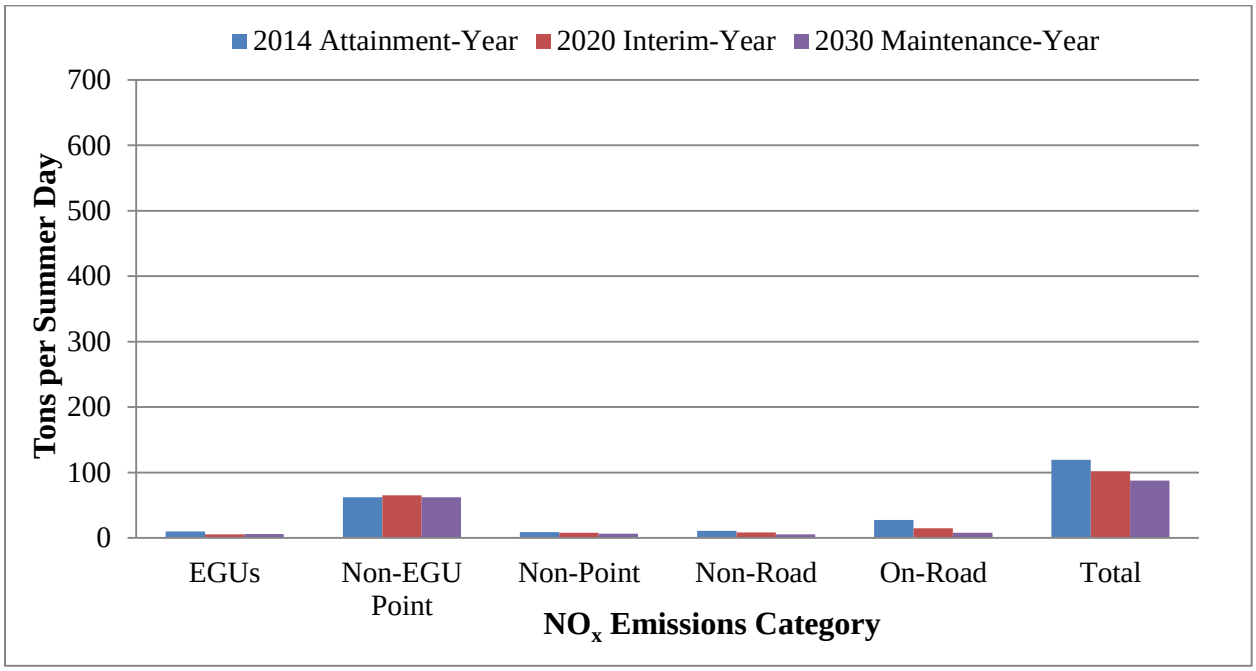
Graph 4.15: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Anthropogenic Sources - Lake and Porter Counties, Indiana



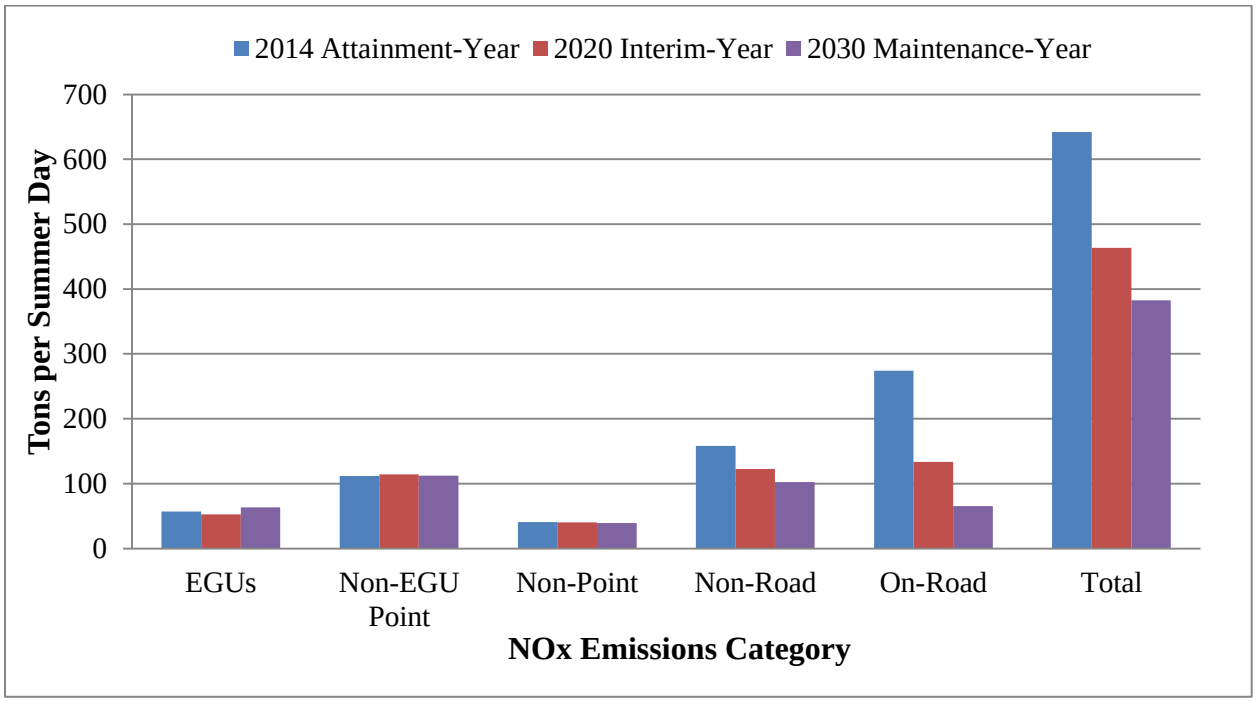
Graph 4.16: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) NO_x Emissions, All Anthropogenic Sources – Entire Chicago Nonattainment Area



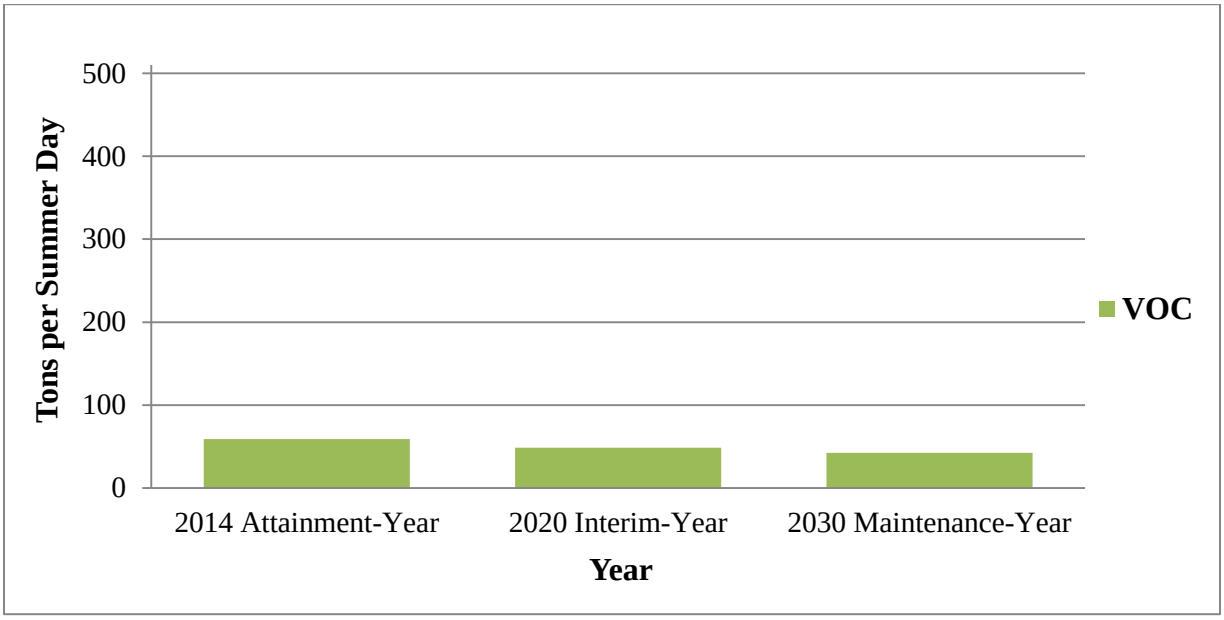
Graph 4.17: Comparison of NO_x Emissions by Source Category, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) - Lake and Porter Counties, Indiana



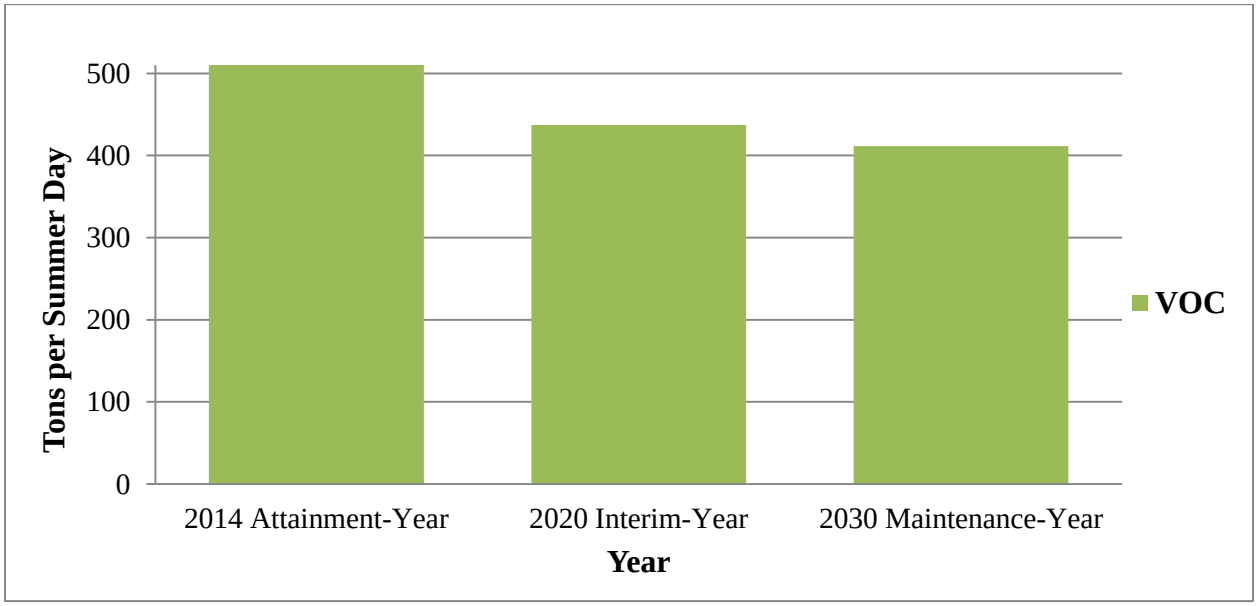
Graph 4.18: Comparison of NO_x Emissions by Source Category, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year – Entire Chicago Nonattainment Area



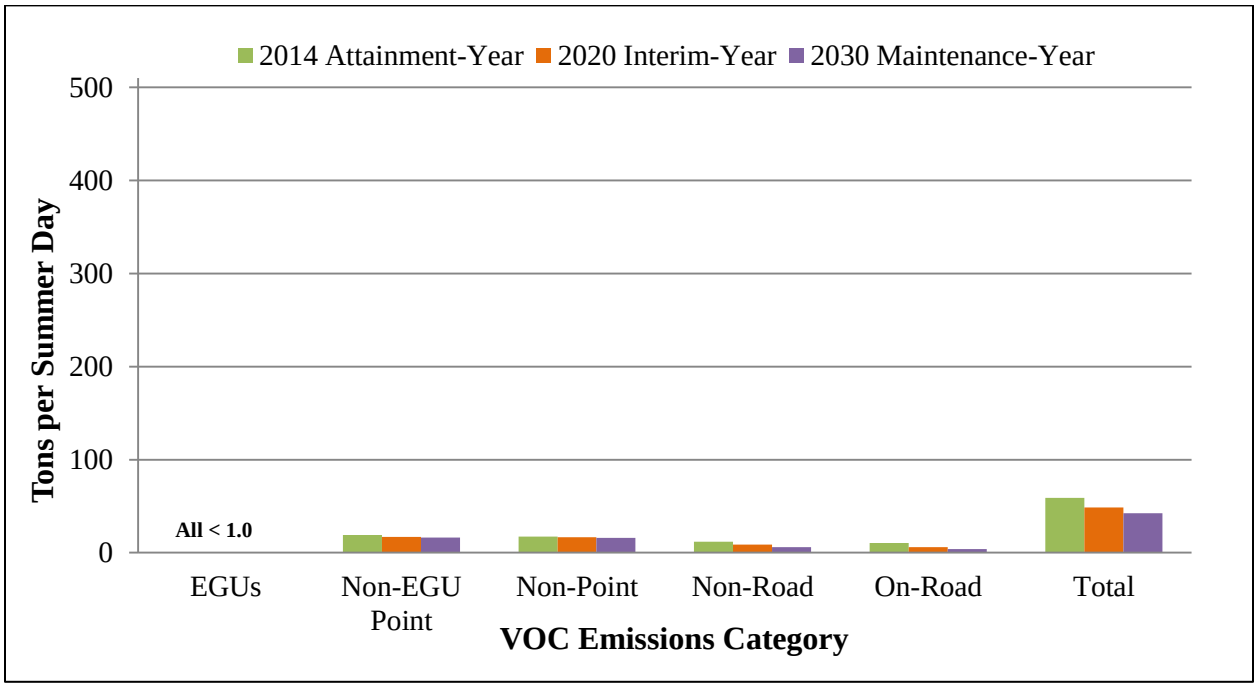
Graph 4.19: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Anthropogenic Sources - Lake and Porter Counties, Indiana



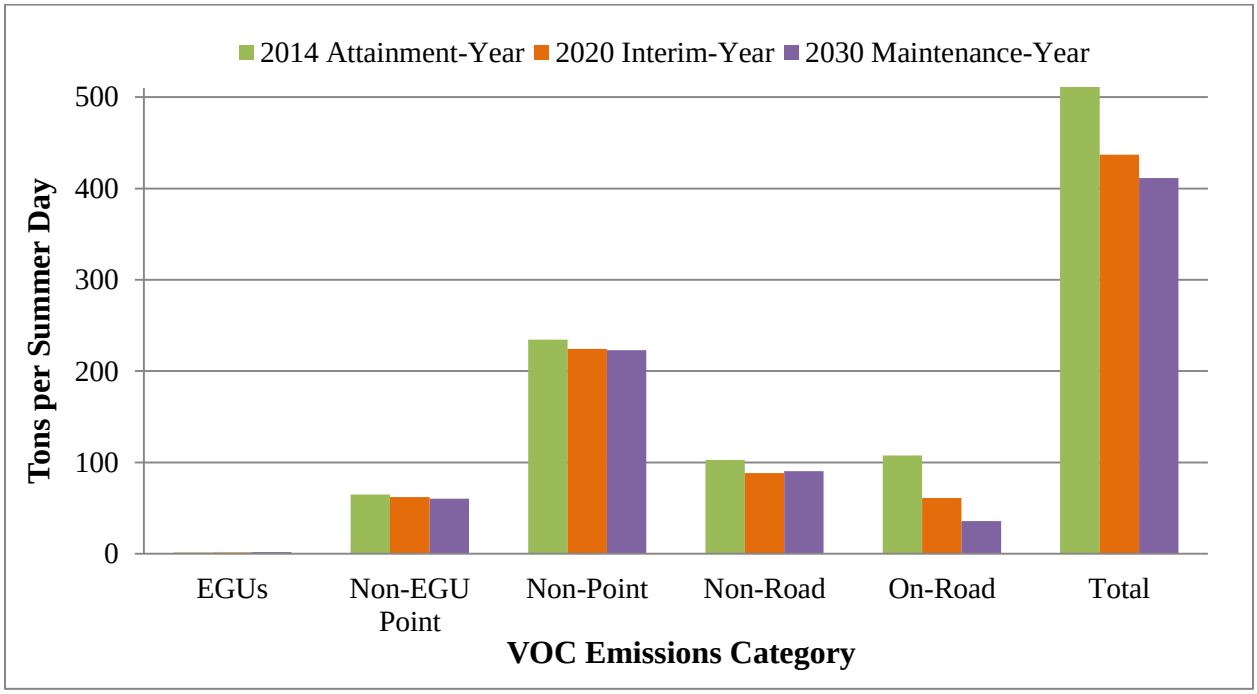
Graph 4.20: Comparison of 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) VOC Emissions, All Anthropogenic Sources – Entire Chicago Nonattainment Area



Graph 4.21: Comparison of VOC Emissions by Source Category, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) - Lake and Porter Counties, Indiana



Graph 4.22: Comparison of VOC Emissions by Source Category, 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year) – Entire Chicago Nonattainment Area



Tables 4.1 and 4.2 compare estimated NO_x and VOC emissions (tpsd) from all sources for the years of 2014 and 2030. NO_x emissions between 2014 and 2030 in Lake and Porter counties are projected to decline by about 27% and about 40% within the entire nonattainment area. VOC emissions between 2014 and 2030 in Lake and Porter counties are projected to decline by about 28% and about 20% in the entire nonattainment area as a whole. The benefits from major federal strategies to reduce emissions, as outlined in Section 6.0 of this document, are factored into these changes. Further, due to implementation of the NO_x SIP Call, and subsequent CAIR and CSAPR programs across the eastern United States, NO_x and ozone levels entering this area will continue to decline.

Table 4.1: Projected NO_x and VOC Emissions Change between 2014 (Attainment-Year) and 2030 (Maintenance-Year) – Lake and Porter Counties, Indiana

Emission	2014 (Attainment –Year)	2030 (Maintenance-Year)	Change	% Change
NO_x tpsd	119.54	87.58	-31.96	-27%
VOC tpsd	59.09	42.33	-16.76	-28%

Table 4.2: Projected NO_x and VOC Emissions Change between 2014 (Attainment-Year) and 2030 (Maintenance-Year) – Entire Chicago Nonattainment Area

Emission	2014 (Attainment –Year)	2030 (Maintenance-Year)	Change	% Change
NO_x tpsd	641.90	382.38	-259.52	-40%
VOC tpsd	511.27	411.55	-99.72	-20%

4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicate that air quality in the entire Chicago nonattainment area met the 2008 8-hour NAAQS for ozone at the end of the 2015 ozone season. U.S. EPA's Redesignation Guidance (pg. 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." Emission projections outlined in Section 4.0 of this document clearly illustrate that NO_x and VOC emissions in Lake and Porter counties, Indiana, as well as the entire nonattainment area, will continue to decline between the 2014 attainment-year and the 2030 maintenance-year. Section 7.0 further discusses the implications of these emission trends and provides an analysis to support these conclusions. Therefore, air quality should remain below the 2008 8-hour ozone standard through the projected years of 2020 and 2030.

In Indiana, major point sources in all counties are required to submit air emissions information once every three (3) years or annually if the NO_x potential to emit is greater than 2,500 tons per year (tpy) or the VOC potential to emit is greater than 250 tpy, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM, in collaboration with U.S. EPA, prepares a new periodic inventory for all criteria pollutants every three (3) years or annually if the aforementioned

emission benchmarks are exceeded. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2017, 2020, and 2023, as necessary to comply with the inventory reporting requirements established in the CAA. Emissions information will be compared to the 2014 attainment-year and the 2030 projected maintenance-year inventories to assess emission trends, as necessary, to assure continued compliance with the 2008 8-hour ozone standard.

4.5 Permanent and Enforceable Emission Reductions

Permanent and enforceable reductions of NO_x and VOCs have resulted in attainment of the 2008 8-hour ozone standard. Some of these reductions were due to the application of RACT rules and some were due to the application of tighter federal standards on new vehicles. Also, Title IV of the CAA and the NO_x SIP Call, and subsequent CAIR and CSAPR programs, required the reduction of NO_x from utility sources. Covered sources are prohibited from reducing or removing emissions controls (anti-backsliding) following the redesignation of the area unless such a change is first approved by U.S. EPA as a revision to Indiana's SIP, consistent with Section 110(l) of the CAA. Section 6.0 identifies the emission control measures specific to Lake and Porter counties, Indiana as well as the implementation status of each measure.

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAA, Indiana commits to submit to the Administrator, eight (8) years after redesignation, an additional revision of the SIP. The revision will contain Indiana's plan for maintaining the national primary 2008 8-hour ozone air quality standard for ten (10) years beyond the first ten (10) year period after redesignation, which would potentially be 2040 in this case.

5.0 TRANSPORTATION CONFORMITY BUDGETS

U.S. EPA requirements outlined in 40 CFR 93.118(e)(4) stipulate that motor vehicle emissions budgets (MVEBs) for NO_x and VOC be established as part of a SIP. The MVEBs are necessary to demonstrate conformance of transportation plans and improvement programs with the SIP. A general summary of the MOVES methodology used in this area can be found in Attachment 2 in Appendix F. In addition, due to the size of the MOVES input and output files, they will be provided electronically to appropriate staff with this submittal.

5.1 On-Road Emission Estimations

The Northwestern Indiana Regional Planning Commission (NIRPC) is the Metropolitan Planning Organization (MPO) for the area that includes Lake, Porter, and LaPorte counties. This organization maintains a travel demand forecast model that is used to simulate traffic in the area and is used to predict what that traffic will be like in future years given growth expectations. The model is used mostly to identify where travel capacity will be needed and to determine the infrastructure requirements necessary to meet that need. It is also used to support the calculation of mobile source emissions. The travel demand forecast model is used to predict the total daily Vehicle Miles Traveled (VMT) and U.S. EPA's MOVES software program is used to calculate

the emissions per mile. The product of these two outputs, once combined, is the total amount of pollution emitted by on-road vehicles for the particular analyzed area.

5.2 Overview

Broadly described, MOVES is used to generate "emission factors," which are the average emissions per mile (grams/mile) for the ozone precursors: NO_x and VOC. There are numerous variables that can affect the emission factors. The vehicle fleet (vehicles on the road) age and the vehicle types have a major effect on the emission factors. The facility type the vehicles are traveling on (MOVES facility types are Freeway and Arterial and distinguish between urban and rural areas) and the vehicle speeds also affect the emission factor values. Meteorological factors, such as hourly air temperature and humidity, and the area's Vehicle Inspection/Maintenance program affect the emission factors as well. These data are estimated using the *best available data* to generate emission factors for appropriate ozone precursors, NO_x and VOC. VMT data is generated by the region's travel demand model. Once emission factors are determined, the emission factor(s) is multiplied by the VMT to ultimately determine the quantity of vehicle emissions. It should be noted that each year analyzed will have different emission factors, volumes, speeds, and likely some additional roadway links. MOVES input and output files can all be found in Attachment 2 of Appendix F.

5.3 Emission Estimates

Table 5.1 outlines the on-road emission estimations (tpsd) for the Lake and Porter ozone nonattainment area for the 2011 base-year, 2014 attainment-year, 2020 interim-year, and 2030 maintenance-year. The 2020 and 2030 emission estimates are based on the actual travel demand model network runs that generate estimated emissions that will exist for the years 2020 and 2030 under the Connections 2040 Comprehensive Regional Plan. The 2011 and 2014 emission estimates were "backcasted" from actual travel demand model network runs for the years 2015 and 2020 as included in the Connections 2040 Comprehensive Regional Plan. Table 5.2 contains the on-road emission estimations (tpsd) for the entire Chicago nonattainment area for the same years of 2011, 2014, and the projected years of 2020 and 2030.

Table 5.1: Emission Estimations and Projections for On-Road Mobile Sources - Lake and Porter Counties, Indiana, 2011 (Base-Year), 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year)

Lake and Porter	2011 (Base-Year)	2014 (Attainment-Year)	2020 (Interim-Year)	2030 (Maintenance-Year)
NO_x tpsd	34.03	27.58	14.68	7.70
VOC tpsd	12.60	10.39	5.96	3.99

Table 5.2: Emission Estimations and Projections for On-Road Mobile Sources – Entire Chicago Nonattainment Area, 2011 (Base-Year), 2014 (Attainment-Year), 2020 (Interim-Year), and 2030 (Maintenance-Year)

Entire Area	2011 (Base-Year)	2014 (Attainment-Year)	2020 (Interim-Year)	2030 (Maintenance-Year)
NO_x tpsd	335.24	274.29	133.59	65.20
VOC tpsd	105.94	107.50	61.22	36.00

5.4 Motor Vehicle Emission Budget

Table 5.3 contains the projected motor vehicle emissions budget (tpsd) for the Lake and Porter ozone nonattainment area. This budget includes the projected emission estimates for 2020 and 2030 with a 15% margin of safety. Since assumptions change over time, IDEM determined a 15% margin of safety to be reasonable to account for such changes within the conformity process. The emission estimates derive from the NIRPC travel demand model and MOVES as described above under the NIRPC 2040 Comprehensive Regional Plan. The emissions calculation methodology, latest planning assumptions and margin of safety were determined through the interagency consultation process described in the Transportation Conformity Memorandum of Understanding (MOU) for NIRPC.

Table 5.3: Motor Vehicle Emission Budget Projections - Lake and Porter Counties, Indiana, 2020 (Interim-Year) and 2030 (Maintenance-Year)

Lake and Porter	2020 (Interim-Year)	2030 (Maintenance-Year)
NO_x tpsd	16.89	8.86
VOC tpsd	6.85	4.59

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in Lake and Porter counties, Indiana, including CAA requirements and additional state or local measures implemented beyond CAA requirements.

6.1 Reasonably Available Control Technology (RACT) and other State Volatile Organic Compound (VOC) Rules

As required by Section 172 of the CAA, Indiana has promulgated several rules requiring RACT for emissions of VOCs since the mid 1990's. In addition, other statewide rules for controlling VOCs have also been promulgated. The Indiana VOC rules are found in 326 IAC 8. The following is a listing of statewide rules that assist with the reduction of VOCs in the state:

326 IAC 8-1-6	New facilities; general reduction requirements (Best Available Control Technology for Non-Specific Sources)
326 IAC 8-2	Surface Coating Emission Limitations
326 IAC 8-3	Organic Solvent Degreasing Operations
326 IAC 8-4	Petroleum Sources
326 IAC 8-5	Miscellaneous Operation
326 IAC 8-6	Organic Solvent Emission Limitations
326 IAC 8-10	Automobile Refinishing
326 IAC 8-14	Architectural and Industrial Maintenance Coatings
326 IAC 8-15	Standards for Consumer and Commercial Products

Additional rules specifically applicable to Lake and Porter counties, Indiana, are summarized in Section 6.2.

6.2 Implementation of Past State Implementation Plans (SIP) Revisions

Lake and Porter counties, Indiana, were previously nonattainment under the 1-hour ozone standard. The area met all of its 1-hour SIP obligations, including an U.S. EPA-approved attainment demonstration. All of the control measures outlined within the Post-1999 (2002, 2005, and 2007) Rate of Progress (ROP) plans have been fully implemented. The area was also designated nonattainment for ozone under the 1997 8-hour standard in 2004. Since that time, the area has attained the 1997 8-hour ozone standard and was redesignated to attainment on May 11, 2010. Therefore, no further SIP revisions are required under the 1997 8-hour ozone standard.

The following information outlines the measures implemented in association with previous SIP submittals that have resulted in permanent and enforceable emission reductions in Lake and Porter counties, Indiana:

6.2.1 Fifteen Percent (15%) Rate of Progress (ROP) Plan

Indiana's final 15% ROP plan was approved by U.S. EPA on July 18, 1997. The measures include a mix of point, area, and mobile source control measures:

1. Enhanced Vehicle Inspection and Maintenance Program

   Regulatory Basis: 326 IAC 13-1.1
   Implementation Status: Equivalent controls remain in place.

2. Stage II Vapor Recovery

Regulatory Basis: 326 IAC 8-4-6
Implementation Status: Controls remains in place due to gasoline dispensers being allowed to decommission stage II controls because of wide-spread use of on-board vehicle controls.

3. Reformulated Gasoline Program

Regulatory Basis: CAA-Federal Control Program
Implementation Status: Control remains in place.

4. National Volatile Organic Compound Emission Standards for Architectural Coatings Rule

Regulatory Basis: 40 CFR Part 59, Subpart D
Implementation Status: Control remains in place.

5. Residential Opening Burning Ban

Regulatory Basis: 326 IAC 4-1
Implementation Status: Control remains in place for all incorporated areas.

6. Non-CTG RACT

Regulatory Basis: 326 IAC 8-7
Implementation Status: Control remains in place.

6.2.2 1999 Nine Percent (9%) ROP

Indiana's final 1999 9% ROP plan was approved by U.S. EPA on January 26, 2000. The reductions included a variety of state and federal measures that affected various industrial and area sources, such as steel mills, small engines (e.g. lawnmowers), gasoline reformulation, and personal solvent usage. The measures included the following:

1. Emission Limits for Benzene from Coke Oven By-Product Recovery Plants

Regulatory Basis: 326 IAC 14-9
Implementation Status: Control remains in place.

2. National Emission Standards for Hazardous Air Pollutants for Coke Oven Batteries

Regulatory Basis: 326 IAC 20-3-1
Implementation Status: Control remains in place.

3. Federal Phase I Reformulated Gasoline on Small Non-Road Engines

Regulatory Basis: Clean Air Act Amendments of 1990; Section 211 of the Clean Air Act
Implementation Status: Control remains in place.

4. Federal Controls on Small Spark-Ignited Engines (July 3, 1995, 60 FR 34581)

   Regulatory Basis: Court-ordered standards for small spark-ignited engines; 40 CFR Part 90
   Implementation Status: Control remains in place.

5. Commercial/Consumer Solvent Reformulation Rule

   Regulatory Basis: 40 CFR 59, Subpart C
   Implementation Status: Control remains in place.

6. Volatile Organic Liquid Storage RACT

   Regulatory Basis: 326 IAC 8-9
   Implementation Status: Control remains in place.

6.2.3 2002 Nine Percent (9%) ROP

Indiana's 2002 9% ROP plan consists of several federal regulations and some measures specific to Indiana, including state rules and negotiated agreements. The reductions included measures that control VOC emissions from steel mill sinter plants, non-road mobile sources, and municipal solid waste landfills. The measures included the following:

1. Additional Reductions from Federal Controls on Small Spark-Ignited Engines (64 FR 15207, March 30, 1999)

   Regulatory Basis: Court-ordered standards for small spark-ignited engines; 40 CFR Part 90
   Implementation Status: Control remains in place.

2. Sinter Plant Rule

   Regulatory Basis: 326 IAC 8-13
   Implementation Status: Control remains in place.

3. Municipal Solid Waste Landfill

   Regulatory Basis: 326 IAC 8-8
   Implementation Status: Control remains in place.

6.2.4 2005 Nine Percent (9%) ROP

Since there were surplus emission reductions from previous plans, no emission reductions were necessary to meet the additional 9% reduction in VOC emissions for the 2005 ROP. However, the plan includes a federal regulation that further reduces the amount of VOCs emitted by non-road small engine sources. The measure includes the following:

1. Further Reductions from Federal Controls on Small Spark-Ignited Engines (65 FR 24268, April 25, 2000)

   Regulatory Basis: Federal Standards for small spark-ignited engines; 40 CFR Part 90
   Implementation Status: Control remains in place.

6.2.5 2007 Six Percent (6%) ROP

Indiana's 2007 6% ROP plan consists of several federal regulations and some measures specific to Indiana, including state rules and negotiated agreements. The reductions included measures that control VOC emissions from petroleum refineries, non-road mobile sources, volatile organic liquid storage operations, cold cleaning degreasing operations, and the reformulation of commercial and consumer products. The measures included the following:

1. Further Reductions from Federal Controls on Small Spark-Ignited Engines (69 FR 1823, January 12, 2004)

   Regulatory Basis: Court-ordered standards for small spark-ignited engines; 40 CFR Part 90
   Implementation Status: Control remains in place.

2. Commercial/Consumer Solvent Reformulation Rule

   Regulatory Basis: 40 CFR 59, Subpart C
   Implementation Status: Control remains in place.

3. Petroleum Refineries National Emission Standards for Hazardous Air Pollutants (NESHAP)

   Regulatory Basis: 326 IAC 20-16
   Implementation Status: Control remains in place.

4. United States Steel-Gary Works Agreed Order with IDEM (March 22, 1996)

   Control Method: Halts the use of untreated water for quenching (326 IAC 6.8-9-3(7))
   Implementation Status: Control remains in place.

5. Volatile Organic Liquid Storage RACT

   Regulatory Basis: 326 IAC 8-9

Implementation Status: Control remains in place.

6. Cold Cleaner Degreasers

Regulatory Basis: 326 IAC 8-3-8
Implementation Status: Control remains in place.

6.3 Nitrogen Oxides (NO_x) Rule[7]

On October 27, 1998, U.S. EPA established the NO_x SIP Call which required twenty-two (22) states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana adopted this rule in 2001. Beginning in 2004, this rule accounts for a reduction of approximately thirty-one percent (31%) of all NO_x emissions statewide compared to previous uncontrolled years.

These rules were also adopted by twenty-one (21) other states. The resulting effect is that significant reductions have occurred within Indiana and regionally due to the number of affected units. The EGU portion of the NO_x SIP Call was replaced by the CAIR and has since been replaced by the CSAPR which continues to result in NO_x controls for EGUs.

On April 21, 2004, U.S. EPA published Phase II of the NO_x SIP Call that established a budget for large (emissions of greater than one ton per day) stationary internal combustion engines. In Indiana, the rule decreased NO_x emissions statewide from natural gas compressor stations by 4,263 tons during the ozone season of May through September. The Indiana Phase II NO_x SIP Call rule became effective in 2006, and implementation began in 2007 (326 IAC 10-5).

6.4 Measures Beyond Clean Air Act (CAA) Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of state and federal control programs. These additional control measures are summarized below.

6.4.1 Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards[8]

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light duty trucks including sport utility vehicles (SUVs). This rule required automakers to produce cleaner cars and refineries to make cleaner lower-sulfur gasoline. This rule was phased in between 2004 and 2009 and resulted in a 77% decrease in NO_x emissions from passenger cars, an 86% decrease from smaller SUVs, light duty trucks, and minivans, and a 65% decrease from 8-larger SUVs, vans, and heavier duty truck classes. This rule also resulted in a 12% decrease in VOC emissions from passenger cars, an 18% decrease from smaller SUVs, light duty trucks, and minivans, and a 15% decrease from larger SUVs, vans, and heavier duty trucks.

[7] http://www.gpo.gov/fdsys/pkg/FR-1998-10-27/pdf/98-26773.pdf
[8] http://www.gpo.gov/fdsys/pkg/FR-2000-02-10/pdf/00-19.pdf

6.4.2 Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards[9]

In March 2014, U.S. EPA finalized a federal rule to further strengthen Tier II vehicle emission and fuel standards. This rule will require automakers to produce cleaner vehicles and refineries to make cleaner lower-sulfur gasoline. This rule will be phased in between 2017 and 2025. Tier III requires all passenger vehicles to meet an average standard of 0.03 gram/mile of NO_x. When compared to Tier II, the Tier III tailpipe standards for light-duty vehicles are expected to reduce NO_x and VOC emissions by approximately 80%. Tier III vehicle standards also include evaporative standards using onboard diagnostics that will result in a 50% reduction in VOC emissions compared to Tier II reductions. The rule reduces the sulfur content of gasoline to 10 ppm beginning in January 2017.

6.4.3 Heavy-Duty Diesel Engines[10]

In January 2001, U.S. EPA issued a final rule for Highway Heavy-Duty Engines, a program that includes low-sulfur diesel fuel standards. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule was phased in from 2004 through 2007 and resulted in a 40% decrease in NO_x emissions from diesel trucks and buses.

6.4.4 Clean Air Non-road Diesel Rule[11]

In May 2004, U.S. EPA issued the Clean Air Non-road Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard similar to the highway diesel program. The engine standards for non-road engines took effect in 2008 and resulted in a 90% decrease in sulfur dioxide (SO_2) emissions from non-road diesel engines. Sulfur levels were also reduced in non-road diesel fuel by 99.5% from approximately 3,000 ppm to 15 ppm.

6.4.5 Non-road Spark-Ignition Engines and Recreational Engine Standards[12]

This standard was effective July 2003, and regulates NO_x, VOCs, and carbon monoxide (CO) for groups of previously unregulated non-road engines. This standard applies to all new engines sold in the United States and imported after the standards went into effect. The standard applies to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain vehicles), and recreational marine diesel engines. When all of the non-road spark-ignition engines and recreational engine standards are fully implemented, an overall 80% reduction in NO_x, 72% reduction in VOC, and 56% reduction in CO emissions are expected by 2020.

[9] http://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf
[10] http://www.gpo.gov/fdsys/pkg/FR-2001-01-18/pdf/01-2.pdf
[11] http://www.gpo.gov/fdsys/pkg/FR-2004-06-29/pdf/04-11293.pdf
[12] http://www.gpo.gov/fdsys/pkg/FR-2002-11-08/pdf/02-23801.pdf

6.4.6 Reciprocating Internal Combustion Engine Standards[13]

This standard was effective May 2010, and regulates emissions of air toxics from existing diesel-powered stationary reciprocating internal combustion engines that meet specific site rating, age, and size criteria. These engines are typically used at industrial facilities (e.g. power, chemical, and manufacturing plants) to generate electricity for compressors and pumps and to produce electricity to pump water for flood and fire control during emergencies. The standard applies to stationary diesel engines: (1) used at area sources of air toxics and constructed or reconstructed before June 12, 2006; (2) used at major sources of air toxics, having a site rating of less than or equal to 500 horsepower, and constructed or reconstructed before June 12, 2006; and, (3) used at major sources of air toxics for non-emergency purposes, having a site rating of greater than 500 horsepower, and constructed or reconstructed before December 19, 2002.

Operators of existing engines were required to: (1) install emissions control equipment that would limit air toxics up to 70% for stationary non-emergency engines with a site rating greater than 300 horsepower; (2) perform emission tests to demonstrate engine performance and compliance with rule requirements; and, (3) burn ultra-low sulfur fuel in stationary non-emergency engines with a site rating greater than 300 horsepower. These engine standards took effect in 2013. According to U.S. EPA estimates, this rule has resulted in emission reductions from existing diesel-powered stationary reciprocating internal combustion engines of approximately 1,000, 2,800, and 27,000 tpy of air toxics, $PM_{2.5}$, and CO, respectively.

6.4.7 Category 3 Marine Diesel Engine Standards[14]

This standard was effective in June 2010, and promulgated more stringent exhaust emission standards for new large marine diesel engines with per-cylinder displacement at or above 30 liters (commonly referred to as Category 3 compression-ignition marine engines) as part of a coordinated strategy to address emissions from all ships that affect U.S. air quality. These emission standards are equivalent to those adopted in the amendments to Annex VI to the International Convention for the Prevention of Pollution from Ships (MARPOL Annex VI). The emission standards apply in two stages: near-term standards for newly built engines, which took effect in 2011, and long-term standards requiring an 80% reduction in NO_x emissions that began in 2016.

U.S. EPA is adopting changes to the diesel fuel program to allow for the production and sale of diesel fuel with up to 1,000 ppm sulfur for use in Category 3 marine vessels. The regulations generally forbid production and sale of fuels with more than 1,000 ppm sulfur for use in most U.S. waters unless operators achieve equivalent emission reductions in other ways.

U.S. EPA is also adopting provisions to apply some emission and fuel standards to foreign-flagged and in-use vessels that are covered by MARPOL Annex VI. When this strategy is fully implemented in 2030, U.S. EPA estimates that NO_x and $PM_{2.5}$ emissions in the U.S. will be reduced by approximately 1.2 million tpy and 143,000 tpy, respectively.

[13] http://www.gpo.gov/fdsys/pkg/FR-2010-03-03/pdf/2010-3508.pdf
[14] http://www.gpo.gov/fdsys/pkg/FR-2010-04-30/pdf/2010-2534.pdf

6.4.8 Clean Air Interstate Rule (CAIR) / Cross State Air Pollution Rule (CSAPR)[15]

On May 12, 2005, U.S. EPA published the following regulation: "Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (CAIR); Revisions to Acid Rain Program; Revisions to the NO_x budget; Final Rule". This rule established the requirement for states to adopt rules limiting the emissions of NO_x and SO_2 and provided a model rule for the states to use in developing their rules in order to meet federal requirements. The purpose of CAIR was to reduce interstate transport of $PM_{2.5}$, SO_2, and ozone precursors (NO_x).

CAIR applied to any stationary fossil fuel-fired boiler, stationary fossil fuel-fired combustion turbine, or a generator with a nameplate capacity of more than 25 megawatt electrical (MWe) producing electricity for sale. This rule provided annual state caps for NO_x and SO_2 in two phases with Phase I caps for NO_x and SO_2 starting in 2009 and 2010, respectively. Phase II caps were to become effective in 2015. U.S. EPA allowed limits to be met through a cap and trade program if a state chose to participate in the program. SO_2 emissions from power plants in the 28 eastern states and the District of Columbia (D.C.) covered by CAIR were to be cut by 4.3 million tons from 2003 levels by 2010 and 5.4 million tons from 2003 levels by 2015. NO_x emissions were to be cut by 1.7 million tons by 2009 and reduced by an additional 1.3 million tons by 2015. In response to U.S. EPA's rulemaking, Indiana adopted a state rule in 2006 based on the model federal rule (326 IAC 24-1, 326 IAC 24-2, and 326 IAC 24-3). Indiana's rule included annual and seasonal NO_x trading programs, and an annual SO_2 trading program. This rule required compliance effective January 1, 2009.

In July 2008, the D.C. Circuit court vacated CAIR and issued a subsequent remand without vacatur of CAIR in December 2008. The court then directed U.S. EPA to revise or replace CAIR in order to address the deficiencies identified by the court. On July 6, 2011, U.S. EPA finalized the CSAPR as a replacement for CAIR. On August 21, 2012, the U.S. Court of Appeals for the D.C. Circuit vacated CSAPR and directed U.S. EPA to continue administering CAIR "pending the promulgation of a valid replacement." In a subsequent decision on the merits, the Court vacated CSAPR based on a subset of petitioners' claims. On April 29, 2014, the U.S. Supreme Court reversed that decision and remanded the case to the D.C. Circuit court for further proceedings. Throughout the initial round of D.C. Circuit proceedings, and the ensuing U.S. Supreme Court proceedings, the stay remained in place and U.S. EPA had continued to implement CAIR. In order to allow CSAPR to replace CAIR in an equitable and orderly manner, while further D.C. Circuit Court proceedings were held to resolve petitioner's remaining claims, U.S. EPA filed a motion asking the D.C. Circuit Court to lift the stay. U.S EPA also asked the court to toll all CSAPR compliance deadlines that had not passed as of the date of the stay order by three years. On October 23, 2014, the Court granted U.S. EPA's motion. CSAPR became effective on January 1, 2015, for SO_2 and annual NO_x, and then on May 1, 2015 for ozone season NO_x. When combined with other final state and U.S. EPA actions it will reduce power plant SO_2 emissions by 73% and NO_x emissions by 54% from 2005 levels in the 28-state CSAPR region that includes the states of Indiana, Illinois, and Wisconsin.

[15] http://www.epa.gov/crossstaterule/actions.html

6.4.9 Oil and Natural Gas Industry Standards[16]

This standard was issued on April 17, 2012, and regulates VOC and air toxic emissions from hydraulically fractured natural gas wells and also includes requirements for several other sources of pollution in the oil and natural gas industry that were previously unregulated in the United States. U.S. EPA estimated that these standards will apply to approximately 11,400 new natural gas wells hydraulically fractured each year and an additional 1,400 existing natural gas wells refractured annually. These standards took effect in 2015. According to U.S. EPA estimates, this rule has resulted in emission reductions of VOC and air toxics of approximately 190,000-290,000 tpy and 12,000-20,000 tpy, respectively.

6.4.10 Mercury and Air Toxic Standards (MATS)[17] [18]

This standard was effective in April 2012, and regulates emissions of mercury, acid gases, and non-mercury metallic toxic pollutants from new and existing coal and oil-fired EGUs. U.S. EPA estimates that this rule will apply to approximately 1,100 coal-fired and 300 oil-fired EGUs at 600 power plants in the United States. According to U.S. EPA, most facilities will comply with these standards through a range of strategies including the use of existing emission controls, upgrades to existing emission controls, installation of new pollution controls, and fuel switching.

Following promulgation of the rule, U.S. EPA received petitions for reconsideration of various provisions of the rule including requests to reconsider the work practice standards applicable during startup periods and shutdown periods. U.S. EPA granted reconsideration of the startup and shutdown provisions as no opportunity to comment was provided to the public regarding the work practice requirements contained in the final rule. On November 30, 2012, U.S. EPA published a proposed rule reconsidering certain new source standards and startup and shutdown provisions in MATS. U.S. EPA proposed certain minor changes to the startup and shutdown provisions contained in the 2012 final rule based on information obtained in the petitions for reconsideration. On April 24, 2013, U.S. EPA took final action on the new source standards that were reconsidered and also the technical corrections contained in the November 30, 2012, proposed action. U.S. EPA did not take final action on the startup and shutdown provisions. On June 25, 2013, U.S. EPA added new information and analysis to the docket and reopened the public comment period for the proposed revisions. U.S. EPA took final action on the remaining topics open for reconsideration on November 19, 2014. The compliance date for existing sources was April 16, 2015, while the compliance date for new sources was April 16, 2012.

On November 25, 2014, the U.S. Supreme Court accepted several challenges to the rules brought by the utility industry and a coalition of nearly two dozen states. On June 29, 2015, the U.S. Supreme Court ruled that U.S. EPA did not properly account for compliance costs when crafting the MATS rule and remanded the decision to the D.C. Circuit Court for reconsideration. As a response, on November 20, 2015, U.S. EPA proposed to find that regulating emissions of toxic air pollution from power plants is applicable and that considering the possible associated costs of compliance does not change that conclusion.

[16] http://www.gpo.gov/fdsys/pkg/FR-2012-08-16/pdf/2012-16806.pdf
[17] http://www.gpo.gov/fdsys/pkg/FR-2012-02-16/pdf/2012-806.pdf,
[18] .http://www.epa.gov/mats/actions.html

6.4.11 Controls Specific to Lake and Porter Counties, Indiana

Local control measures, including some RACT rules specific to Lake and Porter counties, have helped reduce VOC emissions and other types of emissions in Northwest Indiana. These measures include:

326 IAC 8-7	Specific VOC Reduction Requirements
326 IAC 8-8	Municipal Solid Waste Landfills
326 IAC 8-9	Volatile Organic Liquid Storage Vessels
326 IAC 8-11	Wood Furniture Coatings
326 IAC 8-12	Shipbuilding or Ship Repair Operations
326 IAC 8-13	Sinter Plants
326 IAC 8-16	Offset Lithographic Printing and Letterpress Printing
326 IAC 8-17	Industrial Solvent Cleaning Operations
326 IAC 8-18	Synthetic Organic Chemical Manufacturing Industry Air Oxidation, Distillation, and Reactor Processes
326 IAC 8-19	Control of Volatile Organic Compound Emissions from Process Vents in Batch Operations
326 IAC 8-20	Industrial Wastewater
326 IAC 8-21	Aerospace Manufacturing and Rework Operations
326 IAC 8-22	Miscellaneous Industrial Adhesives
326 IAC 13	Motor Vehicle Emission and Fuel Standards (including a motor vehicle inspection and maintenance program for Lake and Porter counties)
326 IAC 4-1-4.1(c)	Ban on residential burning in Lake and Porter counties
40 CFR 80.70(f)(3)	Federal requirement for the use of federal reformulated gasoline (RFG) in Lake and Porter counties

6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures listed above after redesignation, or submit to U.S. EPA as a SIP revision, any changes to its rules or emission limits applicable to NO_x or VOC sources as required for maintenance of the 2008 8-hour ozone standard in Lake and Porter counties, Indiana. Indiana, through IDEM's OAQ and its Compliance and Enforcement Branch, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, IDEM intends to continue enforcing all rules that relate to the emission of ozone precursors in Lake and Porter counties, Indiana.

6.6 New Source Review (NSR) Provisions [19]

Indiana has a long standing and fully implemented NSR program that is outlined in 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2 and the Emission Offset Permitting Program in 326 IAC 2-3. Indiana's PSD program was conditionally approved in the March 3, 2003, *Federal Register* (FR)

[19] https://www.federalregister.gov/articles/2004/05/20/04-11337/approval-and-promulgation-of-implementation-plans-indiana

published at 68 FR 9892 and received final approval on May 20, 2004 (69 FR 29071) by U.S. EPA as part of the SIP.

Any facility that is not listed in the 2014 emission inventory, or for which emission reduction credit through closing was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting all applicable permit rule requirements. The review process will be identical to that used for new sources. Once the Chicago nonattainment area is redesignated to attainment, the OAQ will implement NSR for major sources in Lake and Porter counties, Indiana through the PSD program. This program requires an air quality analysis to evaluate whether the new source will threaten the NAAQS.

Together, these rules will substantially reduce local and regional sources of ozone precursors. The modeling analyses discussed in Section 7.0 include these rules and show the ozone concentrations expected to result from their implementation.

7.0 MODELING ANALYSIS

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

Although U.S. EPA's Redesignation Guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering the Chicago-Naperville, IL-IN-WI, area to determine the effect of national emission control strategies on ozone levels. This area includes Lake and Porter counties in Indiana. These modeling analyses determined that this area was significantly impacted by ozone and ozone precursor transport. Regional NO_x reductions have helped the area attain the 2008 8-hour ozone NAAQS of 0.075 ppm.

7.2 U.S. EPA Modeling Analysis for Interstate Transport "Good Neighbor" Provision

U.S. EPA conducted modeling for the Interstate Transport "Good Neighbor" Provision. This analysis was performed in 2014 and 2015, and was released in the January 2015 "Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment" and the August 2015 "Updated Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment". These documents assist states in developing "Good Neighbor SIPs" as required by the CAA to address interstate transport of air pollution that affects downwind states' ability to attain and maintain the 2008 8-hour ozone NAAQS. Some of the major federal emission strategies included in the modeling are: NESHAPs for Reciprocating Internal Combustion Engines (RICE), NESHAPs for cement manufacturing plants, the Boiler Maximum Achievable Control Technology (MACT) rule, the Energy Independence and Security Act (EISA) renewable fuel standard mandate, New Source Performance Standards (NSPS) for VOC controls, the Mobile Source Air Toxics rule, Tier III Emission Standards for Vehicles and Gasoline Sulfur Standards , Emission Standards for Locomotives and Marine Compression-Ignition Engines, and the Non-road Spark-Ignition Engines and Recreational Engine Standards.

This modeling was conducted to identify monitoring sites that may have difficulty attaining the 2008 Ozone NAAQS in 2018 and identify states that were contributing to attainment issues at a given monitoring site. The air quality model used for this rulemaking was the Comprehensive Air Quality Model with Extensions (CAMx) version 6.10. The modeling domain consisted of a 12 kilometer (km) x 12 km coarse grid and 25 vertical layers from the surface up through the troposphere to a height of 50 millibars of pressure covering the continental United States and portions of Canada and Mexico. Base-year 2011 emissions were modeled. Meteorology from 2011 was created using the Weather Research Forecasting (WRF) Model version 3.4 and was used for the base-case and projected year modeling runs. More detailed information on the CAMx input files and additional data used for the photochemical modeling can be found in U.S. EPA's "Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment," dated January 2015.

Table 7.1 shows the results of U.S. EPA's "Good Neighbor" Provision modeling for ozone impacts at the ozone monitors in the Chicago nonattainment area. The monitor identification number, county, and state locations are listed, as well as the 2009-2013 8-hour ozone base-period average design values that were used to calculate 2018 projected average design values. Note that the 2009–2013 average design values were calculated by averaging the three 3-year design values from 2009–2011, 2010–2012, and 2011–2013.

Model results are used in a relative rather than absolute sense. Relative use of the model results calculates the fractional change in maximum concentrations based on two different emission scenarios, 2011 NEI emissions and 2018 projected emissions for this exercise. This fractional change, also known as a relative response factor (RRF), can be applied to each monitor's average base-period design value to determine ozone impacts. This approach differs from using the absolute or actual modeled result, which may show under- or over-predictions with the actual monitored values. The 2009–2013 average design values were multiplied by the corresponding RRF to determine all 2018 projected average design values. As can be seen in Table 7.1, the results show all modeled 8-hour ozone design values in the entire Chicago nonattainment area are projected to be well below the 2008 8-hour ozone standard of 0.075 ppm.

Table 7.1: Comparison of the Chicago-Naperville, IL-IN-WI, Area Average Design Values with U.S. EPA "Good Neighbor" Provision 2018 Modeling Results

Monitor ID	County	State	Monitored Average Design Value 2009-2013 Base-Period (ppm)	U.S. EPA- Projected Average Design Value 2018 Base-Case (ppm)
17-031-0001	Cook	IL	0.0720	0.0665
17-031-0032	Cook	IL	0.0777	0.0645
17-031-0064	Cook	IL	0.0713	0.0592
17-031-0076	Cook	IL	0.0717	0.0661
17-031-1003	Cook	IL	0.0697	0.0564
17-031-1601	Cook	IL	0.0713	0.0670
17-031-4002	Cook	IL	0.0717	0.0610
17-031-4007	Cook	IL	0.0657	0.0537
17-031-4201	Cook	IL	0.0757	0.0619
17-031-7002	Cook	IL	0.0760	0.0603
17-043-6001	DuPage	IL	0.0663	0.0618
17-089-0005	Kane	IL	0.0697	0.0646
17-097-1007	Lake	IL	0.0793	0.0641
17-111-0001	McHenry	IL	0.0697	0.0640
17-197-1011	Will	IL	0.0640	0.0581
18-089-0022	Lake	IN	0.0667	0.0585
18-089-0030	Lake	IN	0.0697	0.0617
18-089-2008	Lake	IN	0.0680	0.0602
18-127-0024	Porter	IN	0.0703	0.0606
18-127-0026	Porter	IN	0.0630	0.0571
55-059-0019	Kenosha	WI	0.0810	0.0654

U.S. EPA updated this modeling in August 2015 to reflect the requirement of three full ozone seasons to demonstrate compliance with the 2008 8-hour ozone NAAQS. This changed the projection year to 2017 while the base-year remained 2011. Details on the emission projections for 2017 are provided in the "Notice of Availability of the Environmental Protection Agency's Updated Ozone Transport Modeling Data for the 2008 Ozone National Ambient Air Quality

Standard", released in August 2015. The air quality modeling results were released in August 2015 in the "Updated Air Quality Modeling Technical Support Document for the 2008 Ozone NAAQS Transport Assessment." Table 7.2 shows the projected results for all the Chicago area ozone monitors will be well below the 2008 8-hour ozone NAAQS.

Table 7.2: Comparison of the Chicago-Naperville, IL-IN-WI, Area Average Design Values with U.S. EPA "Good Neighbor" Provision 2017 Modeling Results

Monitor ID	County	State	Monitored Average Design Value 2009 – 2013 Base-Period ppm	U.S. EPA- Projected Average Design Value 2017 Base-Case (ppm)
17-031-0001	Cook	IL	0.0720	0.0675
17-031-0032	Cook	IL	0.0777	0.0637
17-031-0064	Cook	IL	0.0713	0.0584
17-031-0076	Cook	IL	0.0717	0.0670
17-031-1003	Cook	IL	0.0697	0.0559
17-031-1601	Cook	IL	0.0713	0.0664
17-031-4002	Cook	IL	0.0717	0.0579
17-031-4007	Cook	IL	0.0657	0.0541
17-031-4201	Cook	IL	0.0757	0.0623
17-031-7002	Cook	IL	0.0760	0.0612
17-043-6001	DuPage	IL	0.0663	0.0618
17-089-0005	Kane	IL	0.0697	0.0665
17-097-1007	Lake	IL	0.0793	0.0650
17-111-0001	McHenry	IL	0.0697	0.0652
17-197-1011	Will	IL	0.0640	0.0589
18-089-0022	Lake	IN	0.0667	0.0602
18-089-0030	Lake	IN	0.0697	0.0613
18-089-2008	Lake	IN	0.0680	0.0598
18-127-0024	Porter	IN	0.0703	0.0625
18-127-0026	Porter	IN	0.0630	0.0584
55-059-0019	Kenosha	WI	0.0810	0.0667

7.3 LADCO Modeling for the 2008 8-Hour Ozone Standard

The Lake Michigan Air Director Consortium (LADCO) performed photochemical modeling for ozone that used the 2018 emissions inventories and model updates. This modeling was performed to support attainment demonstrations for the six-state LADCO region. The photochemical model used by LADCO and Indiana for the 2008 8-hour ozone standard analysis was CAMx version 6.20 that was developed by Environ. This model has been accepted by U.S. EPA as an approved air quality model for regulatory analysis and attainment demonstrations. Requirements of 40 CFR 51.112, as well as the "Guidance on the Use of Models and Other Analyses in Attainment Demonstrations for the 8-hour Ozone NAAQS" (EPA-454/R-05-002, Oct. 2005), are satisfied with the use of CAMx for attainment demonstrations. Meteorology from 2011, as well as 2011 base-year emissions (based on legally enforceable emission controls required by consent decrees, state rules or permit), was used to conduct this modeling. The base-period average design values for attainment purposes were calculated from the periods 2009–2011, 2010–2012, and 2011–2013. The projected year modeled was 2018. Table 7.3 shows modeled ozone concentrations in the Chicago nonattainment area for 2018 will be below the 2008 8-hour ozone standard of 0.075 ppm. LADCO updated the modeling after U.S. EPA updated the projected year to 2017. Table 7.4 reflects the results of this update and shows that all Chicago area monitors continue to attain the NAAQS.

Table 7.3: LADCO's 2018 Modeling Results for the Chicago-Naperville, IL-IN-WI, Area

Monitor ID	County	State	Monitored Average Design Value 2009-2013 Base-Period (ppm)	U.S. EPA – Projected Average Design Value 2018 Base-Case (ppm)
17-031-0001	Cook	IL	0.0720	0.0647
17-031-0032	Cook	IL	0.0777	0.0644
17-031-0064	Cook	IL	0.0713	0.0591
17-031-0076	Cook	IL	0.0717	0.0645
17-031-1003	Cook	IL	0.0697	0.0615
17-031-1601	Cook	IL	0.0713	0.0666
17-031-4002	Cook	IL	0.0717	0.0651
17-031-4007	Cook	IL	0.0657	0.0549
17-031-4201	Cook	IL	0.0757	0.0585
17-031-7002	Cook	IL	0.0760	0.0587
17-043-6001	DuPage	IL	0.0663	0.0625
17-089-0005	Kane	IL	0.0697	0.0646
17-097-1007	Lake	IL	0.0793	0.0609
17-111-0001	McHenry	IL	0.0697	0.0642
17-197-1011	Will	IL	0.0640	0.0597
18-089-0022	Lake	IN	0.0667	0.0575
18-089-0030	Lake	IN	0.0697	0.0580
18-089-2008	Lake	IN	0.0680	0.0566
18-127-0024	Porter	IN	0.0703	0.0593
18-127-0026	Porter	IN	0.0630	0.0566
55-059-0019	Kenosha	WI	0.0810	0.0622

Table 7.4: LADCO's 2017 Modeling Results for the Chicago-Naperville, IL-IN-WI, Area

Monitor ID	County	State	Monitored Average Design Value 2009-2013 Base-Period (ppm)	U.S. EPA- Projected Average Design Value 2017 Base-Case (ppm)
170310001	Cook	IL	0.0720	0.0615
170310032	Cook	IL	0.0777	0.0652
170310064	Cook	IL	0.0713	0.0599
170310076	Cook	IL	0.0717	0.0612
170311003	Cook	IL	0.0697	0.0526
170311601	Cook	IL	0.0713	0.0662
170314002	Cook	IL	0.0717	0.0576
170314007	Cook	IL	0.0657	0.0512
170314201	Cook	IL	0.0757	0.0559
170317002	Cook	IL	0.0760	0.0581
170436001	DuPage	IL	0.0663	0.0615
170890005	Kane	IL	0.0697	0.0653
170971007	Lake	IL	0.0793	0.0616
171110001	McHenry	IL	0.0697	0.0643
171971011	Will	IL	0.0640	0.0593
180890022	Lake	IN	0.0667	0.0584
180890030	Lake	IN	0.0697	0.0595
180892008	Lake	IN	0.0680	0.0580
181270024	Porter	IN	0.0703	0.0614
181270026	Porter	IN	0.0630	0.0567
550590019	Kenosha	WI	0.0810	0.0630

7.4 Meteorological Analysis of High-Ozone Events

A meteorological analysis was performed to demonstrate that the reductions in monitored ozone were the result of permanent and enforceable reductions in precursor emissions and not the result of unusually favorable meteorology. Appendix G provides the details of a Classification and Regression Tree (CART) analysis performed by LADCO that clearly demonstrates that the improvement in air quality was not the result of favorable meteorology.

7.5 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling shows that national emission control measures will bring the Chicago area into attainment of the 2008 8-hour ozone NAAQS by 2017/2018, if not earlier. Rulemakings to be implemented in the next several years will provide assurance that air quality will continue to meet the standard into the future. U.S. EPA's modeling support for the Interstate Transport "Good Neighbor" Provision show that future year design values for the Chicago Area will maintain the ozone standard with the 2017 projected average design values well below the 2008 8-hour ozone NAAQS of 0.075 ppm. In addition, LADCO's modeling results continue to show 2018 projected average design values lower than the standard. U.S. EPA and LADCO modeling demonstrates that the Chicago-Naperville IL-IN-WI, ozone nonattainment area will continue to attain the 2008 8-hour ozone standard. Future national and local emission control strategies will ensure that the area's attainment will be maintained with an increasing margin of safety over time.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.6, Indiana commits to review its Maintenance Plan eight (8) years after redesignation, as required by Section 175(A) of the CAA. Thus, the interim and maintenance-years will be extended by ten years to 2030 and 2040.

8.2 Commitment for Contingency Measures

Indiana commits to adopt and expeditiously implement necessary corrective actions in the following circumstances:

Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) 4th high monitored value of 0.079 ppm occurs in a single ozone season or a two-year average 4th high monitored value of 0.076 ppm or greater occurs within the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend. It will also take into consideration ease and timing for implementation, as well as economic and social considerations. Implementation of necessary controls in response to a Warning Level Response trigger will take place as expeditiously as possible, but in no event later than twelve months from the conclusion of the most recent ozone season.

Action Level Response

An Action Level Response shall be prompted whenever a violation of the standard (three-year average fourth high monitored value of 0.076 ppm or greater) occurs within the maintenance area. In the event that the Action Level is triggered and is not found to be due to an exceptional

event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of the NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected and be in place within eighteen (18) months from the close of the ozone season that prompted the Action Level. Should it be determined that any of the above action is necessary the following procedures for control selection and implementation shall be followed.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include posting of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by the State of Indiana's Environmental Rules Board.

If a new measure or control is already promulgated and scheduled to be implemented at the federal or state level, and that measure or control is determined to be sufficient to address the upward trend in air quality, additional local measures may be unnecessary. Furthermore, Indiana will submit to U.S. EPA an analysis to demonstrate that the proposed measure(s) are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered. The selection of measures will be based upon cost-effectiveness, emission-reduction potential, economic and social considerations, or other factors that IDEM deems appropriate. IDEM will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of ozone precursor emissions. It is not possible at this time to determine what control measure(s) will be appropriate at an unspecified time in the future. Therefore, the list of contingency measures outlined below is not comprehensive. Indiana anticipates that if contingency measures should ever be necessary, it is unlikely that a significant number (i.e., all those listed below) will be required.

1. Enhancements to the vehicle emissions testing program (increased weight limit, addition of diesel vehicles, etc.)
2. Asphalt paving (lower VOC formulation)
3. Diesel exhaust retrofits
4. Traffic flow improvements
5. Idle reduction programs
6. Portable fuel container regulation (statewide)
7. Park and ride facilities
8. Rideshare/carpool program
9. VOC cap/trade program for major stationary sources
10. NO_x Reasonably Available Control Technology

At the time these measures are under consideration an opportunity for full public participation will be provided, during which the relative costs and benefits of individual measures can be fully evaluated. There will not be any contingency measure implemented without providing the opportunity for full public participation.

9.0 PUBLIC PARTICIPATION

This section will be completed after the public hearing process is completed.

10.0 CONCLUSIONS

Lake and Porter counties, along with the remaining portion of the Chicago-Naperville, IL-IN-WI nonattainment area, have attained the 2008 8-hour NAAQS for ozone. This petition demonstrates that Lake and Porter counties have complied with the applicable provisions of the CAA regarding redesignation of ozone nonattainment areas. IDEM has prepared a Redesignation Request and Maintenance Plan that meets the requirement of Section 110(a)(1) of the CAA.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. Additional significant regional NO_x and VOC emission reductions following implementation of Phase II NO_x SIP Call and CSAPR and/or its replacement rule or program will ensure continued compliance (maintenance) with the standard. Indiana has ensured that all CAA requirements necessary to support redesignation have been met.

Under the previous 1-hour ozone standard and the 1997 8-hour ozone standard, controls have been implemented in Lake and Porter counties that are more stringent than in any other portion of Indiana. These controls are comparable to controls implemented elsewhere within the nonattainment area and shall remain in effect following redesignation to ensure continued compliance with the standard.

In addition to the corrective actions (should they be necessary) outlined in this submittal, Indiana continues to participate in the regional air quality planning efforts sponsored by LADCO. The current goal of the planning process is to establish a regional control strategy that provides for attainment of the ozone and fine particle standards throughout the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Along with the other LADCO states, Indiana is developing local and statewide emission control measures where photochemical modeling and culpability analyses demonstrate a clear need. Cost effectiveness analyses justify the implementation of such measures. These actions will provide for an even greater margin of safety for the Chicago area and ensure continued maintenance with the standard well into the future.

Based on this presentation, Indiana's portion of the Chicago-Naperville, IL-IN-WI, nonattainment area (Lake and Porter counties) meets the requirements for redesignation under Section 107(d)(3) of the CAA and U.S. EPA guidance. Furthermore, because this area is subject to transport, additional regional NO_x and VOC reductions will ensure continued compliance (maintenance) with the 2008 8-hour ozone standard and provide an increased margin of safety.

Consistent with the authority granted to U.S. EPA under Section 107(d)(3) of the CAA, Indiana requests that Lake and Porter counties be redesignated from nonattainment to attainment of the 2008 8-hour ozone standard simultaneously with U.S. EPA approval of the Redesignation Request and Maintenance Plan provisions contained herein.